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**82- SUBMISSIONS FACING SHEET**

MICROFICHE CONTROL LABEL



REGISTRANT'S NAME

WheelTug plc

\*CURRENT ADDRESS

Suite 3G, EuroLife Building  
1 Corral Road  
Gibraltar

\*\*FORMER NAME

\*\*NEW ADDRESS

FILE NO. 82-

35108

FISCAL YEAR

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SEP 19 2007  
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FINANCIAL

• Complete for initial submissions only \*\* Please note name and address changes

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THE COMPANIES ORDINANCE  
OF THE LAWS OF GIBRALTAR  
PUBLIC LIMITED COMPANY LIMITED BY SHARES

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OFFICE OF THE REGISTRAR  
CORPORATE FINANCE

**MEMORANDUM OF ASSOCIATION**  
OF  
**WHEELTUG PUBLIC LIMITED COMPANY**

**1. NAME**

The name of the Company is **WHEELTUG PUBLIC LIMITED COMPANY.**

**2. REGISTERED OFFICE**

The Registered Office of the Company will be situated in Gibraltar.

**3. GENERAL OBJECTS AND POWERS**

- (1) The Company is a public company limited by shares.
- (2) The object of the Company is to engage in any act or activity that is not prohibited under any law for the time being in force in Gibraltar and in particular
- (3) The Company may not:
  - a) carry on business with persons resident in Gibraltar;
  - b) own an interest in real property situated in Gibraltar, other than a lease referred to in paragraph (e) of sub-clause (4);
  - c) carry on banking or trust business, unless it is licensed to do so under the Banking Ordinance and the Financial Services Ordinance respectively;
  - d) carry on business as an insurance or reinsurance company, insurance agent or insurance broker, unless it is licensed to do so under the Insurance Companies Ordinance and the Financial Services Ordinance respectively;
  - e) carry on the business of company management, unless it is licensed under the Financial Services Ordinance;
- (4) For purpose of paragraph (a) of subclause (3), the Company shall not be treated as carrying on business with persons resident in Gibraltar if:
  - a) It makes or maintains deposits with a person carrying on banking business within Gibraltar
  - b) It makes or maintains professional contact with solicitors, barristers, accountants, bookkeepers, trust companies, administration companies, investment advisors or other similar persons carrying on business within Gibraltar;
  - c) It prepares or maintain books and records within Gibraltar;
  - d) It holds within Gibraltar meetings of its directors or members;
  - e) It holds a lease of property for use as an office from which to communicate with members or where books and records of the Company are prepared or maintained;
  - f) It holds shares, debt obligations or other securities in a company incorporated under The Companies Ordinance; or The Companies (Share Allotment and Capital Maintenance) Ordinance 1998.
  - g) Shares, debt obligations or other securities in the Company are owned by any person resident in Gibraltar or by any company incorporated under The Gibraltar Ordinance.

- (5) The Company shall have all such powers as are permitted by law for the time being in force in Gibraltar irrespective of corporate benefit, to perform all acts and engage in all activities which are necessary or conducive to the conduct, promotion or attainment of the object of the Company.
- (6) The Company shall have all powers to settle its assets or property or any part thereof in trust, or to transfer the same to any other company or entity, whether for the protection of its assets or not and with respect to such settlement or transfer the directors may provide that the Company, its creditors, its members or any person having a direct or indirect interest in the Company may be beneficiaries, creditors, members, certificate holders, partners or holders of any other similar interest, in such other company or entity.
- (7) The directors may, by resolution of directors, exercise all the powers of the Company to borrow money and to mortgage or charge its undertakings and property or any part thereof, to issue debentures, debenture stock and other securities whenever money is borrowed or as security for any debt, liability or obligation of the Company or of any third party.
- (8) The Company may, by resolution of directors, mortgage, charge, sell, transfer, lease, exchange or otherwise encumber or dispose of any or all of the assets, undertakings and property of the Company, whether in the usual or regular course of the business of the Company or not, without authorisation by a resolution of members.
4. **CURRENCY**  
Shares in the Company shall be issued in the currency of the United States of America.
5. **AUTHORISED CAPITAL**  
The authorised capital of the Company is \$100,000.00 USD.
6. **CLASSES, MEMBER AND PAR VALUE OF SHARES**  
The authorised capital is made up of ordinary shares divided as 10,000,000.00 shares of \$0.01 USD par value each.
7. **DESIGNATIONS, POWERS, PREFERENCES, ETC. OF SHARES**  
The designations, powers, preferences, rights, qualifications, limitations and restrictions of each class and series of shares that the Company is authorised to issue shall be fixed by resolution of directors, but the directors shall not allocate different rights as to voting, dividends, redemption or distributions on liquidation unless the Memorandum of Association shall have been amended to create separate classes of shares and all the aforesaid rights as to voting, dividends, redemption and distributions shall be identical as among the shares in each separate class.
8. **VARIATION OF CLASS RIGHTS**  
If at any time the authorised capital is divided into different classes or series of shares, the rights attached to any class or series (unless otherwise provided by the terms of issue of the shares of that class or series) may, whether or not the Company is being wound up, be varied with the consent of the holders of a simple majority of the issued shares of that class or series and of the holders of a simple majority of the issued shares of any other class or series of shares which may be affected by such variation.
9. **RIGHTS NOT VARIED BY THE ISSUE OF SHARES PARI PASSU**  
Rights conferred upon the holders of the shares of any class issued with preferred or other rights shall not, unless otherwise expressly provided by the terms of issue of the shares of that class, be deemed to be varied by the creation or issue of further shares ranking pari passu therewith.
10. **TRANSFER OF SHARES**  
Registered shares in the Company may be transferred without the prior or subsequent approval of the Company in such manner as the Directors may decide.
11. **AMENDMENT OF MEMORANDUM AND ARTICLES OF ASSOCIATION**  
The Company may amend its Memorandum of Association and Articles of Association in General meeting, as per the Articles of Association.

We, the subscribers to this Memorandum of Association, wish to be formed into a Company pursuant to this Memorandum; and we agree to take the number of shares shown opposite my name.  
by Subscriber

Name and Address of Subscriber		Number of shares taken by Subscriber
1.	Robert T. Bauer 2425 SW Nebraska Street Portland, Oregon 97239-1972 United States of America	One  Signed _____
2.	Isaiah W. Cox 27 Heathway Court London NW3 7TS United Kingdom	One  Signed _____
3.	Rodney T. Cox 23545 NW Skyline Boulevard North Plains, Oregon 97133-9204 United States of America	One  Signed _____
4.	Wayne S. Marshall 23-8 <sup>th</sup> Avenue New York, New York 10027-6029 United States of America	One  Signed _____
5.	Peter Vanderwicken P O Box 66 Carversville, Pennsylvania 18913-0066 United States of America	One  Signed _____
6.	Giulio Pontecorvo 423 W 120 <sup>th</sup> Street, #43 New York, New York 10027-6029 United States of America	One  Signed _____
7.	Chorus Motors Public Limited Company Montagu Pavilion 8-10 Queensway Gibraltar	One  Signed _____
Total shares taken		Seven

Dated this 25<sup>th</sup> day January 2005

Witness to the above Signature:-

Alison Bula  
58 Knights Court,  
Upper Withams Road  
Gibraltar.

PUBLIC LIMITED COMPANY LIMITED BY SHARES

ARTICLES OF ASSOCIATION

OF

**WHEELTUG PUBLIC LIMITED COMPANY**

**INTERPRETATION**

1. In these Articles, if not inconsistent with the subject or context, the words and expressions standing in the first column of the following table shall bear the meanings set opposite them respectively in the second column thereof.

<b><u>Words</u></b>	<b><u>Meanings</u></b>
<b>capital</b>	The sum of the aggregate par value of all outstanding shares with par value of the Company and shares with par value held by the Company as treasury shares plus <ul style="list-style-type: none"> <li>a) the aggregate of the amounts designated as capital of all outstanding shares without par value of the Company and</li> <li>b) the amounts as are from time to time transferred from surplus to capital by a resolution of directors.</li> </ul>
<b>member person</b>	A person who holds shares in the Company. An individual, a corporation, a trust, the estate of a deceased individual, a partnership or an unincorporated association of persons.
<b>resolution of directors</b>	<ul style="list-style-type: none"> <li>a) A resolution approved at a duly constituted meeting of directors of the Company or of a committee of directors of the Company by the affirmative vote of a simple majority of the directors present at the meeting who voted and did not abstain; or</li> <li>b) A resolution consented to in writing by all directors or of all members of the committee, as the case may be.</li> </ul> <p>Except that where a director is given more than one vote, he shall be counted by the number of votes he casts for the purpose of establishing a majority.</p>
<b>resolution of members</b>	<ul style="list-style-type: none"> <li>a) A resolution approved at a duly convened and constituted meeting of the members of the Company by the affirmative vote of                             <ul style="list-style-type: none"> <li>I. a simple majority of the votes of the shares entitled to vote thereon which were present at the meeting and were voted and did not abstain, or</li> <li>II. a simple majority of the votes of each class or series of shares which were present at the meeting and entitled to vote thereon as a class or series and were voted and did not abstain and of a simple majority of the votes of the remaining shares entitled to vote thereon which were present at the meeting and were voted and did not abstain; or</li> </ul> </li> <li>b) a resolution consented to in writing by                             <ul style="list-style-type: none"> <li>I. an absolute majority of the votes of shares entitled to vote thereon, or</li> <li>II. an absolute majority of the votes of each class or series of shares entitled to vote thereon as a class or series and of an absolute majority of the votes of the remaining shares entitled to vote thereon.</li> </ul> </li> </ul>

<b>securities</b>	Shares and debt obligations of every kind, and options, warrants and rights to acquire shares, or debt obligations.
<b>surplus</b>	The excess, if any, at the time of the determination of the total assets of the Company over the aggregate of its total liabilities, as shown in its books of account, plus the Company's capital.
<b>the Memorandum</b>	The Memorandum of Association of the Company as originally registered or as from time to time amended.
<b>the Ordinance</b>	The Companies Ordinance including any modification, extension, re-enactment or renewal thereof and any regulations made thereunder.
<b>the Seal</b>	Any Seal which has been duly adopted as the Seal of the Company.
<b>these Articles</b>	These Articles of Association as originally registered or as from time to time amended.
<b>treasury shares</b>	Shares in the Company that are not issued or that were previously issued but were redeemed.

"Written" or any term of like import includes words typewritten, printed, painted, engraved, lithographed, photographed or represented or reproduced by any mode of representing or reproducing words in a visible form, including telecopier, telex, telegram, cable, e-mail, or other form of writing produced by electronic communication.

Save as aforesaid any words or expressions defined in the Ordinance shall bear the same meaning in these Articles.

Whenever the singular or plural number, or the masculine, feminine or neuter gender is used in these Articles, it shall, where the context admits, include the others.

A reference in these Articles to voting in relation to shares shall be construed as a reference to voting by members holding the shares except that it is the votes allocated to the shares that shall be counted and not the number of members who actually voted and a reference to shares being present at a meeting shall be given a corresponding construction.

A reference to money in these Articles is a reference to the currency of the United States of America unless otherwise stated.

#### **REGISTERED SHARES**

2. The Company shall issue to every member holding registered shares in the Company a certificate signed by a director or officer of the Company under the Seal of the Company specifying the number and type of share or shares held by him and the signature of the director or officer and the Seal may be facsimiles. The share certificates need to bear separate distinctive numbers.
3. Any member receiving a share certificate for registered shares shall indemnify and hold the Company and its directors and officers harmless from any loss or liability which it or they may incur by reason of wrongful or fraudulent use or representation made by any person by virtue of the possession thereof. If a share certificate for registered shares is worn out or lost, it may be renewed on production of the worn out certificate or on satisfactory proof of its loss together with such indemnity as may be required by a resolution of directors.
4. If several persons are registered as joint holders of any shares, any one of such persons may give an effectual receipt for any dividend payable in respect of such shares.

#### **SHARES, AUTHORISED CAPITAL AND CAPITAL**

5. Subject to the provisions of these Articles and any resolution of members the unissued shares of the Company shall be at the disposal of the directors who may without prejudice to any rights previously conferred on the holders of any existing shares or class or series of shares, offer, allot, grant options over or otherwise dispose of the shares to such persons, at such times and upon such terms and conditions as the Company may by resolution of directors determine.
6. Shares in the Company shall be issued for money, services rendered, personal property, an estate in real property, a promissory note or other binding obligation to contribute money or property or any combination of the foregoing as shall be determined by a resolution of directors.

7. Shares in the Company may be issued for such amount of consideration as the directors may from time to time by resolution of directors determine, except that in the case of shares with par value, the amount shall not be less than the par value, and in the absence of fraud the decision of the directors as to the value of the consideration received by the Company in respect of the issue is conclusive unless a question of law is involved. The consideration in respect of the shares constitutes capital to the extent of the par value and the excess constitutes surplus.
8. A share issued by the Company upon conversion of, or in exchange for, another share or a debt obligation or other security in the Company, shall be treated for all purposes as having been issued for money equal to the consideration received or deemed to have been received by the Company in respect of the other share, debt obligation or security.
9. Treasury shares may be disposed of by the Company on such terms and conditions (not otherwise inconsistent with these Articles) as the Company may by resolution of directors determine.
10. The Company may issue fractions of a share and a fractional share shall have the same corresponding fractional liabilities, limitations, preferences, privileges, qualifications, restrictions, rights and other attributes of a whole share of the same class or series of shares.
11. Upon the issue by the Company of a share without par value, if an amount is stated in the Memorandum to be authorised capital represented by such shares then each share shall be issued for no less than the appropriate proportion of such amount which shall constitute capital, otherwise the consideration in respect of the share constitutes capital to the extent designated by the directors and the excess constitutes surplus, except that the directors must designate as capital an amount of the consideration that is at least equal to the amount that the share is entitled to as a preference, if any, in the assets of the Company upon liquidation of the Company.
12. The Company may redeem its own shares but only out of surplus or in exchange for newly issued shares of equal value but no redemption shall be made unless the directors determine that immediately after the redemption the Company will be able to satisfy its liabilities as they become due in the ordinary course of its business and the realisable value of the assets of the Company will not be less than the sum of its total liabilities, other than deferred taxes, as shown in the books of account, and its capital and, in the absence of fraud, the decision of the directors as to the realisable value of the assets of the Company is conclusive, unless a question of law is involved. The Company may trade in its own shares, and in the shares of its subsidiary and affiliated companies without restriction as long as the directors determine that such trades are in the best interests of the members of the Company.
13. A determination by the directors under the preceding Article is not required where shares are redeemed
  - a) pursuant to a right of a member to have redeemed or to have his shares exchanged for money or other property of the Company;
  - b) by virtue of the provisions of Section 147 of the Ordinance; and
  - c) pursuant to an order of the court.
14. Shares that the Company redeems pursuant to Article 12 may be cancelled or held as treasury shares unless the shares are redeemed out of capital and would otherwise infringe upon the requirements of Article 29, or to the extent that such shares are in excess of 80 percent of the issued shares of the Company, in which case they shall be cancelled but they shall be available for reissue.
15. Upon the cancellation of a share, the amount included as capital of the Company with respect to that share shall be deducted from the capital of the Company.

#### **LIEN**

16. The Company shall have a lien on every share, whether fully paid or not, and whether registered in the name of one or more members, and accordingly in Regulation 7 of Table 'A' the words "not being fully paid share" and "other than fully paid shares" shall be omitted; and the words "a single person" shall be deleted and the words "any member, whether alone or jointly with other members" shall be substituted therefor.

#### **TRANSFER OF SHARES**

17. Subject to any limitations in the Memorandum, registered shares in the Company may be transferred in such manner as the directors may from time to time decide, including that a professional share transfer agent be retained to maintain the share registry and transfer shares on behalf of the Company.

18. The Company shall not be required to treat a transferee of a registered share in the Company as a member until the transferee's name has been entered in the share register.
19. Subject to any limitations in the Memorandum, the Company must on the application of the transferor or transferee of a registered share in the Company enter in the share register the name of the transferee of the share save that the registration of transfers may be suspended and the share register closed at such times and for such periods as the Company may from time to time by resolution of directors determine provided always that such registration shall not be suspended and the share register closed for more than 60 days in any period of 12 months.

#### **TRANSMISSION OF SHARES**

20. The executor or administrator of a deceased member, the guardian of an incompetent member or the trustee of a bankrupt member shall be the only person recognised by the Company as having any title to his share but they shall not be entitled to exercise any rights as a member of the Company until they have proceeded as set forth in the next following three Articles.
21. The production to the Company of any document which is evidence of probate of the will, or letters of administration of the estate, or confirmation as executor, of a deceased member or of the appointment of a guardian of an incompetent member or the trustee of a bankrupt member shall be accepted by the Company even if the deceased, incompetent or bankrupt member is domiciled outside Gibraltar if the document evidencing the grant of probate or letter of administration, confirmation as executor, appointment as guardian or trustee in bankruptcy is issued by a foreign court which has competent jurisdiction in the matter. For the purpose of establishing whether or not a foreign court is of competent jurisdiction the directors may obtain appropriate legal advice. The directors may also require an indemnity to be given by the executor, administrator, guardian or trustee in bankruptcy.
22. Any person becoming entitled by operation of law or otherwise to a share or shares in consequence of the death, incompetence or bankruptcy of any member may be registered as a member upon such evidence being produced as may reasonably be required by the directors. An application by any such person to be registered as a member shall for all purposes be deemed to be a transfer of shares and the directors shall treat it as such.
23. Any person who has become entitled to a share or shares in consequence of the death, incompetence or bankruptcy of any member may, instead of being registered himself, request in writing that some person to be named by him be registered as the transferee of such share or shares and such request shall likewise be treated as if it were a transfer.
24. What amounts to incompetence on the part of a person is a matter to be determined by the court having regard to all the relevant evidence and the circumstances of the case.

#### **REDUCTION OR INCREASE IN AUTHORISED CAPITAL OR CAPITAL**

25. Subject to the provisions of Article 31, the Company may in General Meeting amend the Memorandum to increase its authorised capital and in connection therewith the Company may in respect of any unissued shares increase the number of such shares and increase the par value of any such shares or effect any combination of the foregoing.
26. The Company may by Special Resolution amend the Memorandum to reduce its authorised capital and in connection therewith the Company may in respect of any unissued shares reduce the number of such shares, reduce the par value of any such shares or effect any combination of the foregoing.
27. Subject to the provisions of Article 31, the Company may amend the Memorandum to:
- a) divide the shares, including issued shares, of a class or series into a larger number of shares of the same class or series; or
  - b) combine the shares, including issued shares, of a class or series into a smaller number of shares of the same class or series, provided, however, that where shares are divided or combined under a. or b. of this Article, the aggregate par value of the new shares must be equal to the aggregate par value of the original shares.
28. Subject to the provisions of Article 31, the capital of the Company may in General Meeting be increased by transferring an amount of the surplus of the Company to capital.



29. Subject to the provisions of the next succeeding Articles the capital of the Company may by special resolution be reduced by:
- returning to members any amount received by the Company upon the issue of any of its shares, the amount being surplus to the requirements of the Company; or
  - cancelling any capital that is lost or not represented by assets having a realisable value; or
  - transferring capital to surplus for the purpose of redeeming shares that the directors have resolved to redeem.
30. No reduction of capital shall be effected that reduces the capital of the Company to an amount that immediately after the reduction is less than the aggregate par value of all outstanding shares with par value and all shares with par value held by the Company as treasury shares and the aggregate of the amounts designated as capital of all outstanding shares without par value and all shares without par value held by the Company as treasury shares that are entitled to a preference, if any, in the assets of the Company upon liquidation of the Company.
31. The capital or authorised capital of the Company can only be increased beyond 10,000,000 shares by a two-thirds (2/3) approval of not less than 75% of the total outstanding shares of the Company voting at a meeting of the members.

#### **MEETINGS AND CONSENTS OF MEMBERS**

32. The annual meeting of the members shall be held at such time and place in each year as the Board of Directors shall from time to time determine.
33. Other meetings of members may be convened
- by order of the President and/or of the Chief Executive Officer, or
  - by the affirmative vote of a majority of the Board of Directors, or
  - by a member or members who own twenty percent (20%) or more of the voting shares of the Company.
- Meetings will be held at such times and in such manner and places within or outside Gibraltar as the directors consider necessary or desirable.
34. The directors shall give not less than 21 days notice of meetings of members to those persons whose names on the date the notice is given appear as members in the share register of the Company.
35. The directors may fix the date notice is given of a meeting of members as the record date for determining those shares that are entitled to vote at the meeting.
36. The inadvertent failure of the directors to give notice of a meeting to a member, or the fact that a member has not received notice, does not invalidate the meeting.
37. A member may be represented at a meeting of members by a proxy who may speak and vote on behalf of the member.
38. The instrument appointing a proxy shall be produced at the place appointed for the meeting before the time for holding the meeting at which the person named in such instrument proposes to vote.
39. An instrument appointing a proxy shall be in substantially the following form or such other form as the Chairman of the meeting shall accept as properly evidencing the wishes of the member appointing the proxy.

#### **[COMPANY NAME]**

I/We ..... being a member of the above Company with shares HEREBY APPOINT ..... of ..... to be my/our proxy to vote for me/us at the meeting of members to be held on the .....day of the month of .....in the year..... and at any adjournment thereof.

Signed this.....day of the month of .....in the year.....

.....  
Member

40. At any meeting of the members, beneficial owners of shares may vote those shares to which they have beneficial ownership where the direct owner of the shares is not voting those shares, when such beneficial ownership is supported by documentary evidence. This evidence may be a broker's statement or other credible documentation acceptable to the directors of the Company.

41. The following shall apply in respect of joint ownership of shares
  - a) if two or more persons hold shares jointly each of them may be present in person or by proxy at a meeting of members and may speak as a member;
  - b) if only one of the joint owners is present in person or by proxy he may vote on behalf of all joint owners; and
  - c) if two or more of the joint owners are present in person or by proxy they must vote as one.
42. A member shall be deemed to be present at a meeting of members if he participates by telephone or e-mail or other electronic means and all members participating in the meeting are able to communicate with one another.
43. A meeting of members is duly constituted if, at the commencement of the meeting, there are present in person or by proxy not less than 20 percent of the votes of the shares or class or series of shares entitled to vote on resolutions of members to be considered at the meeting.
44. If within two hours from the time appointed for the meeting a quorum is not present, the meeting, if convened upon the requisition of members, shall be dissolved; in any other case it shall stand adjourned to the next business day at the same time and place or to such other time and place as the directors may determine, and if at the adjourned meeting there are present within one hour from the time appointed for the meeting in person or by proxy or by telephone or by e-mail or other electronic means not less than 20 percent of the votes of the shares or each class or series of shares entitled to vote on the resolutions to be considered by the meeting, those present shall constitute a quorum but otherwise the meeting shall be dissolved.
45. At every meeting of members, the Chairman of the Board of Directors shall preside as chairman of the meeting. If there is no Chairman of the Board of Directors or if the Chairman of the Board of Directors is not present at the meeting, the members present shall choose some one of their number to be the chairman. If the members are unable to choose a chairman for any reason, then the person representing the greatest number of voting shares present in person or by prescribed form of proxy at the meeting shall preside as chairman, failing which the oldest individual member or representative of a member present shall take the chair.
46. The chairman may, with the consent of the meeting, adjourn any meeting from time to time, and from place to place, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place.
47. At any meeting of the members the chairman shall be responsible for deciding in such manner as he shall consider appropriate whether any resolution has been carried or not and the result of his decision shall be announced to the meeting and recorded in the minutes thereof. If the chairman shall have any doubt as to the outcome of any resolution put to the vote, he shall cause a poll to be taken of all votes cast upon such resolution, but if the chairman shall fail to take a poll then any member present in person or by proxy who disputes the announcement by the chairman of the result of any vote may immediately following such announcement demand that a poll be taken and the chairman shall thereupon cause a poll to be taken. If a poll is taken at any meeting, the result thereof shall be duly recorded in the minutes of that meeting by the chairman.
48. Any person other than an individual shall be regarded as one member and subject to Article 41 the right of any individual to speak for or represent such member shall be determined by the law of the jurisdiction where, and by the documents by which, the person is constituted or derives its existence. In case of doubt, the directors may in good faith seek legal advice from any qualified person and unless and until a court of competent jurisdiction shall otherwise rule the directors may rely and act upon such advice without incurring any liability to any member.
49. Any person other than an individual which is a member of the Company may by resolution of its directors or other governing body authorise such person as it thinks fit to act as its representative at any meeting of the Company or of any class of members of the Company, and the person so authorised shall be entitled to exercise the same powers on behalf of the person which he represents as that person could exercise if it were an individual member of the Company.
50. The chairman of any meeting at which a vote is cast by proxy or on behalf of any person other than an individual may call for a notarially certified copy of such proxy or authority which shall be produced within 7 days of being so requested or the votes cast by such proxy or on behalf of such person shall be disregarded.

51. Directors of the Company may attend and speak at any meeting of members of the Company and at any separate meeting of the holders of any class or series of shares in the Company.
52. An action that may be taken by the members at a meeting may also be taken by a resolution of members, representing not less than 75 percent of the votes of the shares or class or series of shares entitled to vote on resolutions of members, consented to in writing or by telex, telegram, cable, facsimile, e-mail or other written electronic communication, without the need for any notice, but if any resolution of members is agreed otherwise than by the unanimous written consent of all represented members, then said resolution shall have no standing, and shall not be adopted.

#### **DIRECTORS**

53. The names of the first Directors shall be determined in writing by the majority of the subscribers to the Memorandum of Association. The members of the Board shall be divided into three classes, the classes to be as nearly equal in number as possible. The term of office of the Directors of the first class shall expire at the first annual meeting of members after their election, that of the second class shall expire at the second annual meeting after their election, and that of the third class to expire at the third annual meeting after their election. At each annual general meeting of the members following the adoption of these articles, the successors to the class of Directors whose term expires at that meeting shall be elected to hold office for a term expiring at the annual meeting of members held in the third year following the year of their election and until their successors have been elected and qualified.
54. The minimum number of directors shall be three and the maximum number shall be fifteen.
55. Each director shall hold office for the term, if any, fixed by resolution of members or until his earlier death, resignation or removal.
56. The members may from time to time, by affirmative vote of two-thirds (2/3) of shares entitled to vote at a general meeting of members, remove any Director or Directors for cause before the expiration of his or their period of office and elect any qualified person or persons in his or their stead for the balance of his or their term at a general meeting of members, of which notice specifying the intention to pass such resolution shall have been given.
57. A director may resign his office by giving written notice of his resignation to the Company and the resignation shall have effect from the date the notice is received by the Company or from such later date as may be specified in the notice.
58. The office of a director shall be vacated:
  - a) if he is adjudged bankrupt;
  - b) if he becomes of unsound mind;
  - c) if he is absent from the Meetings of the directors for six months without the leave of the other directors or a majority of the other directors;
  - d) if by notice in writing left at or sent to the office of the Company, he resigns; or
  - e) if he becomes prohibited by law from acting as a director.
59. A vacancy in the Board of Directors may be filled by a resolution of members or by a resolution of not less than two-thirds (2/3) of the remaining directors.
60. With the prior or subsequent approval by a resolution of members, the directors may, by a resolution of directors, fix the emoluments of directors with respect to services to be rendered in any capacity to the Company.

#### **POWERS OF DIRECTORS**

61. The business and affairs of the Company shall be managed by the directors who may exercise all such powers of the Company as are noted by the Ordinance or by the Memorandum or these Articles required to be exercised by the members of the Company, subject to any delegation of such powers as may be authorised by these Articles and to such requirements as may be prescribed by a resolution of members; but no requirement made by a resolution of members shall prevail if it be inconsistent with these Articles nor shall such requirement invalidate any prior act of the directors which would have been valid if such requirement had not been made.

62. All action taken and things done by any meeting of persons acting as a Board of Directors or by any person acting as a Director shall, notwithstanding that it shall afterwards be discovered that there was some defect in the election, appointment or qualification of such Board or Director, be as valid as though such defect had not obtained.
63. The directors may, by a resolution of directors, appoint any person, including a person who is a director, to be an officer or agent of the Company.
64. Every officer or agent of the Company has such powers and authority of the directors, including the power and authority to affix the Seal, as are set forth in these Articles or in the resolution of directors appointing the officer or agent, except that no officer or agent has any power or authority with respect to fixing the emoluments of directors.
65. Any director which is a body corporate may appoint any person its duly authorised representative for the purpose of representing it at meetings of the Board of Directors or with respect to unanimous written consents.
66. The continuing directors may act notwithstanding any vacancy in their body, save that if their number is reduced below the number fixed by or pursuant to these Articles as the necessary quorum for a meeting of directors, the continuing directors or director may act only for the purpose of appointing directors to fill any vacancy that has arisen for summoning a meeting of members.
67. All cheques, promissory notes, drafts, bills of exchange and other negotiable instruments and all receipts for moneys paid to the Company, shall be signed, drawn, accepted, endorsed or otherwise executed, as the case may be, in such manner as shall from time to time be determined by resolution of directors.

#### **PROCEEDINGS OF DIRECTORS**

68. The directors of the Company or any committee hereof may meet at such times and in such manner and places within or outside Gibraltar as the directors may determine to be necessary or desirable.
69. A director shall be deemed to be present at a meeting of directors if he participates by telephone or e-mail or other electronic means and all directors participating in the meeting are able to communicate with one another.
70. A director shall be given not less than 48 hours notice of meetings of directors, but a meeting of directors held without 48 hours notice having been given to all directors shall be valid if all the directors entitled to vote at the meeting who do not attend, waive notice of the meeting and for this purpose, the presence of a director at a meeting shall constitute waiver on his part. The inadvertent failure to give notice of a meeting to a director, or the fact that a director has not received the notices, does not invalidate the meeting.
71. A director may by a written instrument appoint an alternate who need not be a director and an alternate is entitled to attend meetings in the absence of the director who appointed him and to vote or consent in place of the director.
72. A meeting of directors is duly constituted for all purposes if at the commencement of the meeting there are present in person or by alternate or by telephone or by e-mail or other electronic means not less than two-thirds (2/3) of the total number of directors, unless there are only two directors in which case the quorum shall be two.
73. At every meeting of the directors the Chairman of the Board of Directors shall preside as chairman of the meeting. If there is no Chairman of the Board of Directors or if the Chairman of the Board of Directors is not present at the meeting the Vice-Chairman of the Board of Directors shall preside. If there is no Vice Chairman of the Board of Directors or if the Vice Chairman of the Board of Directors is not present at the meeting the directors present shall choose some one of their number to be chairman of the meeting.
74. An action that may be taken by the directors or a committee of directors at a meeting may also be taken by a resolution of directors or a committee of directors consented to in writing or by telex, telegram, cable, facsimile, e-mail, or other written electronic communication by all directors or all members of the committee as the case may be, without the need for any notice.

75. The directors shall cause the following corporate records to be kept:
  - a) minutes of all meetings of directors, members, committees of directors, committees of officers and committees of members;
  - b) copies of all resolutions consented to by directors, members, committees of directors, committees of officers and committees of members; and
  - c) such other accounts and records as the directors by resolution of directors consider necessary or desirable in order to reflect the financial position of the Company.
76. The books, records and minutes shall be kept at the registered office of the Company or at such other place as the directors determine. These shall be open for inspection by any member of the Board at all reasonable business hours.
77. The Board of Directors shall have a Chairman and a three (3) person to five (5) person Executive Committee, Audit Committee and Compensation Committee, and as many other Committees of the Board of Directors, as the directors may deem appropriate.
78. Each committee of directors has such powers and authorities of the directors, including the power and authority to affix the Seal, as are set forth in the resolution of directors establishing the committee, except that no committee has any power or authority either to amend the Memorandum or these Articles.
79. The Executive committee shall have no less than three members and no more than five. The Board of Directors elects the Executive Committee after each annual meeting. The Executive Committee has the authority to function for the full Board of Directors and can bind the Company subject to Normal Board and Regulatory Approvals where appropriate. The Executive Committee is for ease of operation, though it is generally assumed that the Executive Committee deliberations will be carried out in electronic communications to which all directors are privy.
80. The meetings and proceedings of each committee of directors consisting of two or more directors shall be governed mutatis mutandis by the provisions of these Articles regulating the proceedings of directors so far as the same are not superseded by any provisions in the resolution establishing the committee.

#### **FINANCING**

81. The Board of Directors may from time to time:
  - a) borrow money upon the credit of the Company;
  - b) limit or increase the amount to be borrowed;
  - c) issue shares in the Company subject to the following: The share capitalization of the Company is limited to 10,000,000 shares outstanding. This can be changed only by a two-thirds (2/3) approval of not less than 75% of the total outstanding shares of the Company voting at a meeting of the members;
  - d) repurchase or borrow Company shares, directly or indirectly and sell, trade or use them in any manner to finance the Company, subject to the reporting requirements in the jurisdictions where the shares trade and to the laws of Gibraltar. The Company has the right to sell shares, debentures or other securities in subsidiary or directly or indirectly controlled companies for such sums and at such prices as may be deemed expedient, subject to the reporting requirements in the jurisdictions where the shares trade and to the laws of Gibraltar;
  - e) secure any such shares or debentures or other securities in subsidiary companies or directly or indirectly controlled companies or any other present or future borrowing or liability of subsidiary or directly or indirectly controlled companies of the Company by mortgage, charge or pledge of all or any currently owned or subsequently acquired real and personal, movable or immovable property directly or indirectly owned; and
  - f) pay commission for financing or sales of shares or properties or interests that benefit the Company or its subsidiary or directly or indirectly controlled companies.
82. The Board of Directors, may from time to time authorize any Director or Directors, Officer or Officers, Employee of the Company or other person or persons, whether connected with the Company or not, to make arrangements for subsidiary companies or companies controlled indirectly or directly with references to the money borrowed or to be borrowed as aforesaid, and as to the terms and conditions of the loan thereof, and with the power to vary or modify such arrangements, terms and conditions and to give such additional securities.

83. The Company may borrow money from officers and directors and others for its ongoing business needs on such terms and conditions as the directors may from time to time authorize.
84. The Board of Directors may from time to time authorize any director or directors, officer or officers, employee or agents of the Company, or other person or persons, whether connected with the Company or not, to sign, execute and give on behalf of the Company, and its subsidiary companies, and directly and indirectly controlled companies, all documents, agreements, promises and other writings necessary or desirable for the purposes aforesaid to draw, make, accept, endorse, execute and issue cheques, wire transfers, money orders, purchases and sales of securities, promissory notes, bills of exchange, bills of lading, and other negotiable or transferable instruments, and the same and all renewals thereof or substitutions thereof so signed shall be binding upon the Company.
85. The powers hereby conferred shall be and be deemed to be in supplement of, and not in substitution for, any powers to borrow money, or conduct business for the purposes of the Company possessed by its directors or officers.
86. The Directors shall cause a proper register to be kept in accordance with the Ordinance of all mortgages and charges specifically affecting the property of the Company and shall duly comply with the requirements of the Ordinance.

#### **OFFICERS**

87. The officers of the Company shall be a President, a Chief Executive Officer (CEO), a Secretary and such other officers as the Board in its discretion may from time to time elect. The President and/or the CEO may from time to time appoint persons who are not corporate officers to executive or administrative offices, with such titles as the President and/or the CEO in his/their discretion may determine.
88. Any offices except those of President and Secretary may be held by the same person.
89. The officers shall perform such duties as shall be prescribed at the time of their appointment subject to any modification in such duties as may be prescribed thereafter by resolution of directors or resolution of members.
90. The remuneration of all officers of the Company shall be established by the Compensation Committee of the Board in such manner as it may from time to time determine.
91. The officers of the Company shall hold office until their successors are duly elected and qualified, but any officer elected or appointed by the directors may be removed at any time, with or without cause, by resolution of directors. Any vacancy occurring in any office of the Company may be filled by resolution of directors.
92. Except to the extent from time to time otherwise determined by resolution of the Board, the President and the CEO shall be the Executive Officers of the Company and shall have general supervision of all other Officers and their duties.
93. Subject to any statutory limitation, the President and/or the CEO may from time to time delegate to any other person the powers, authority and duties of any Officer.
94. Subject to such limitation as the Board may from time to time impose, an Officer shall have all the powers and authority and shall perform all the duties as may from time to time be imposed upon the holder of such office by the Articles of Association of the Company or by resolution of the Board.

#### CONFLICT OF INTERESTS

95. If a director, officer or employee of the Company is a director or officer of another company or holds a beneficial interest of 5% or more, directly or indirectly, in a company or property, such other company or property may not be vended into the Company unless
- a) the terms of such contract are fully disclosed in advance to the Board of Directors of the Company; and
  - b) if the cost to the Company exceeds \$50,000 USD, then the contract must be approved by a two-thirds (2/3) majority of the Board of Directors, with the director or directors involved abstaining; and
  - c) if the cost to the Company exceeds \$200,000 USD then the contract must be ratified by two-thirds (2/3) of the members of the Company in attendance at a regular or special meeting of members called to consider the subject contract.
- These restrictions do not apply to the provision of goods and services in the ordinary course of business.

#### INDEMNIFICATION

96. No director shall be disqualified by his office or by reason of holding any other office or place of profit under the Company or under any company in which the Company shall be a shareholder or otherwise interested from entering into any contract or arrangement with the Company as a provider of goods and services in the ordinary course of business; nor shall any such contract or arrangement be thereby avoided; nor shall any director be liable to account to the Company for any profit arising from any such contract or arrangement; nor shall any director be liable to account to the Company for any profit arising from any such office or place of profit or realized by any such contract or arrangement, subject to Article 95. Subject to any statutory requirement, every Director shall be obligated to make relevant disclosure of all such interests and shall refrain from voting on all issues involving such interests.
97. No director or Officer of the Company, while in office and acting in his official capacity shall be liable for: the acts, receipts, neglects or defaults of any other person; or for joining in any receipt or act of conformity; or for any loss, damage or expense happening to the Company through the insufficiency or deficiency of title to any property acquired by, for or on behalf of the Company; or for the insufficiency or deficiency of any security in or upon which any moneys of the Company are invested; or for any loss or damages arising from the bankruptcy, insolvency or tortious act of any person with whom any moneys, securities, or other property of the Company are lodged or deposited; or for any other loss, damage, or misfortune whatever which may arise out of the execution of the duties of his office or in relation thereto unless the same shall happen by or through his own willful and wrongful act.
98. Any contract entered into or action taken or omitted by or on behalf of the Company shall, if approved by a resolution of the members in General Meeting, be deemed for all purposed to have had prior authorization of all members.
99. The Company may purchase and maintain insurance in relation to any person who is or was a director, or an officer of the Company, or who at the request of the Company is or was serving as a director, or an officer of, or in any other capacity is or was acting for another company or a partnership, joint venture, trust or other enterprise, against any liability asserted against the person and incurred by the person in that capacity, whether or not the Company has or would have had the power to indemnify the person against the liability. The Company may purchase and maintain life insurance in relation to any person who is or was a director, or an officer of the Company, or serving as a consultant to the Company, in any amount with the Company as a primary beneficiary.

#### SEAL

100. The seal, an impression whereof is stamped on the margin hereof, shall be the seal of the Company.

101. The Company may have more than one seal and references herein to the Seal shall be references to every seal which shall have been duly adopted by resolution of directors. The directors shall provide for the safe custody of the Seal and for an imprint thereof to be kept at the Registered Office. Except as otherwise expressly provided herein the Seal when affixed to any written instrument shall be witnessed and attested to by the signature of a director or any other person so authorised from time to time by resolution of directors. Such authorisation may be before or after the Seal is affixed may be general or specific and may refer to any number of sealings. The directors may provide for a facsimile of the Seal and of the signature of any director or authorised person which may be reproduced by printing or other means on any instrument and it shall have the same force and validity as if the Seal had been affixed to such instrument and the same had been signed as hereinbefore described.

#### **MERGER/ACQUISITION**

102. In the event that two thirds (2/3) of the entire Board of Directors shall approve the acquisition of the Company by any individual, group of individuals or business entity, or the merger of the Company with any other business entity, such approval shall become effective upon ratification by not less than two-thirds (2/3) of the outstanding shares of the Company entitled to vote at a meeting of the members of the Company especially called for such purpose.
103. In the event that any such acquisition or merger of the Company shall not be approved by the Board of Directors as set forth above, then such disapproval may be over-ridden by an affirmative vote of not less than three-quarters (3/4) of the total outstanding shares at a meeting of members of the Company specially called for such purpose.

#### **DIVIDENDS**

104. Dividends shall be payable from time to time only to the extent and as and when and in what manner the Board of Directors, at its discretion, may from time to time determine.
105. Subject to any applicable statutory provisions, the Board may fix in advance a date preceding, by not more than thirty (30) days the date for payment of any dividend or share distribution or any other form of distribution to the members, as a Record Date for the determination of the rights to receive the distribution as the case may be and in every such case only such person as shall be members of record at the close of business on the date so fixed shall be entitled to receive payment of such dividend, notwithstanding the transfer of any shares after any such record date fixed as aforesaid.
106. If the dividend is payable in cash, then it shall be paid by cheque drawn to the order of each registered holder of shares of the Company, which has been declared and mailed by Air Mail, postage prepaid to such registered holder at his address as recorded on the books of the Company, unless such holder otherwise directs. In the case of joint holders, the cheque shall, unless such joint holders otherwise direct, be made payable to the order of all of such holders and if more than one address is recorded on the books of the Company in respect to such joint holding, the cheque shall be mailed to the first address so recorded. The mailing of such a cheque as the aforesaid shall satisfy and discharge all liability for the dividend to the extent of the sum presented thereby, unless such cheque is not paid upon due presentation. In the event of non-receipt of any dividend cheque thereby the person to whom it is so sent at aforesaid address, the Company shall issue or cause to be issued to such person a replacement cheque for the like amount upon such terms as to indemnify the Company and such evidence of non-receipts as the President and/or the CEO may from time to time prescribe, whether generally or in any particular case.

#### **WITHHOLDING INFORMATION FROM MEMBERS**

107. No member shall be entitled by virtue of being a member to discovery of any information or records respecting the Company or its business except under authority which may be general or specific of a Resolution of the Board, saving always the statutory rights of a member.

#### **ACCOUNTS**

108. The books of account if any shall be kept at the registered office of the Company, or at such other place or places as the directors think fit.
109. The directors may, if they deem it fit, cause to be made out and may serve on the members or lay before a meeting of members a profit and loss account for a period in the case of the first account since the incorporation of the Company and in any other case, since the preceding account, made to a date not earlier than the date of the notice by more than twelve months, and a balance sheet as at the date to which the profit and loss account is made up.



110. Copies of any such profit and loss account and balance sheet shall be made available to every member of the Company.
111. The accounts of the Company are to be kept in accordance with the provisions of generally accepted accounting practices in Gibraltar.
112. The directors shall, in accordance with the Ordinance cause to be made out in every year and to be laid before the Company in General Meeting a balance sheet and profit and loss account to be decided upon by the directors and made up to a date not earlier than the date of the Meeting by more than nine months.

#### **AUDIT**

113. The Company may by resolution of members call for the accounts to be examined by auditors.
114. The first auditors shall be appointed by resolution of directors; subsequent auditors shall be appointed by a resolution of members and their duties regulated in accordance with the Ordinance.
115. The auditors shall examine each profit and loss account and balance sheet required to be served on every member of the Company or laid before a meeting of the members of the Company and shall state in a written report whether or not:
- a. in their opinion the profit and loss account and balance sheet give a true and fair view respectively of the profit and loss for the period covered by the accounts, and of the state of affairs of the Company at the end of that period;
  - b. all the information and explanations required by the auditors have been obtained.
116. The report of the auditors shall be annexed to the accounts and shall be presented at the meeting of members at which the accounts are laid before the Company or shall be served on the members.
117. Every auditor of the Company shall have a right of access at all times to the books of account and vouchers of the Company, and shall be entitled to require from the directors and officers of the Company such information and explanations as he thinks necessary for the performance of the duties of the auditors.
118. The auditors of the Company shall be entitled to receive notice of, and to attend any meetings of members of the Company at which the Company's profit and loss account and balance sheet are to be presented.

#### **SECRETARY**

119. A secretary shall be appointed by the directors for such term, at such remuneration and upon such conditions as they may think fit; and any secretary so appointed may be removed by them.

#### **NOTICES**

120. Any notice, information or written statement to be given by the Company to members must be served to the physical address or the e-mail address of such shareholder appearing on the books of the Company or, if not so appearing, to the last physical and/or e-mail address known to the person charged with serving such notice, and for such purpose the address of any shareholder on the books of the Company may be changed in accordance with any information which appears to be reliable: and any notice with respect to shares registered in the names of more than one person shall be given to whichever of such persons is named first in the share register and notice so given shall be sufficient notice to all holders thereof.
121. Any summons, notice, order, document, process, information or written statement to be served on the Company may be served by leaving it, or by sending it by registered mail addressed to the Company, at its registered office.
122. Service of any summons, notice, order, document, process, information or written statement to be served on the Company may be proved by showing that the summons, notice, order, document, process, information or written statement was mailed in such time as to admit to its being delivered in the normal course of delivery within the period prescribed for service and was correctly addressed and the postage was prepaid.

123. Any notice or other communication delivered in person shall be deemed to have been given at the time of delivery, and any notice or other communications sent by Air Mail or Registered Post shall be deemed to have been given on the day of mailing, and any notice or other communication sent by any means of wire or wireless including e-mail and fax or any form or recorded communication shall be deemed to have been given the day when it was sent electronically, and any communication delivered by Courier shall be deemed to have been given on the day it was delivered to the appropriate agency for dispatch; and a certificate in respect of any thereof in writing signed by any officer of the Company or by an agent of the Company shall be conclusive evidence of the matters therein certified.
124. Every person who by any means whatsoever becomes entitled to any share shall be bound by every notice in respect thereof given to his predecessor in title to the name and address of such person being entered in the share register of the holder thereof.
125. Any notice or other communication duly given to any member shall, notwithstanding that such member be then deceased and whether or not the Company have notice thereof, be deemed to have been duly served upon all persons, including his heirs, executors, administrator or assigns, having any title to or interest in the shares registered in the name of such member either as sole holder or as holder thereof jointly with others.
126. The signature to any notice or other communication to be given by the Company may be in whole or in part written, stamped, typewritten, electronically signed, e-mailed, printed or done in any other consistent verifiable manner.
127. The accidental omission to send any notice to any member, director, officer or auditors or the non-receipt of any notice by any member, director, officer or auditors or any error in the notice not affecting the substance thereof shall not invalidate any action taken at any meeting held pursuant to such notice or otherwise founded thereon.
128. Any Member, Director or Officer, or the Auditors, may waive any notice requirement to be given by the Articles or Memorandum or by statute, and such waiver whether given before or after the meeting or other event of which notice is required to be given shall cure any default in the giving of such notice.

#### **VOLUNTARY WINDING UP AND DISSOLUTION**

129. Subject to any rights which may exist in favor of any particular class of shares, if the assets of Company shall be insufficient to repay the whole of the paid up capital, such assets shall be distributed, so that as nearly as may be, the deficiency shall be born by the members in proportion to the capital paid up or which ought to have been paid up at the commencement of the winding up of the shares held by them respectively, and if on a winding up, the assets available for distribution among the members shall be more than sufficient to repay the whole of the capital paid up, at the commencement of the winding up, the excess shall be distributed among the members in proportion to the capital at the commencement of the winding up, paid or which ought to have been paid up on the shares held by them respectively.
130. Subject to any rights which may exist in favour of any particular class of shares, but subject to the provisions of any law from time to time in force with regard thereto, any part of the assets of the Company, including any shares in other companies, may be divided among the members of the Company in specie, or may be vested in trustees for the benefit of such members and the liquidation of the Company may be closed and the Company dissolved, but so that no members shall be compelled to accept any shares or otherwise whereon there is any liability.

1. Robert T. Bauer  
2425 SW Nebraska Street  
Portland, Oregon 97239-1972  
United States of America
2. Isaiah W. Cox  
27 Heathway Court  
London NW3 7TS  
United Kingdom
3. Rodney T. Cox  
23545 NW Skyline Boulevard  
North Plains, Oregon 97133-9204  
United States of America
4. Wayne S. Marshall  
23-8<sup>th</sup> Avenue  
New York, New York 10027-6029  
United States of America
5. Peter Vanderwicken  
P O Box 66  
Carversville, Pennsylvania 18913-0066  
United States of America
6. Giulio Pontecorvo  
423 W 120<sup>th</sup> Street, #43  
New York, New York 10027-6029  
United States of America
7. Chorus Motors Public Limited Company  
Montagu Pavilion  
8-10 Queensway  
Gibraltar

Dated this 25<sup>th</sup> day of January 2005

Witness to the above Signature:-

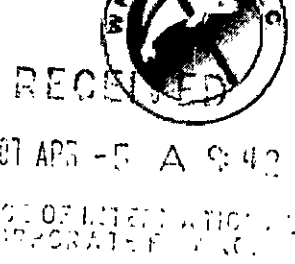
Alison Bula  
58 Knights Court,  
Upper Withams Road  
Gibraltar

## **List of Authorized Signatories**

1. Rodney T. Cox;
2. Isaiah Cox; and
3. Fidecs Management Limited

# WheelTug plc

GIBRALTAR COMPANY NUMBER 68312  
INFORMATION CIRCULAR  
Fiscal Year 2006



## 1. SOLICITATION OF PROXIES:

This information circular is furnished in connection with the solicitation of proxies by the Management of WheelTug plc ("Company") for use at its Annual Meeting of Members to be held 20 June 2006 in Gibraltar and via the Internet at [www.wheeltug.gi](http://www.wheeltug.gi), with the Record Date of the meeting being 4 May 2006, for the purposes set forth in the Notice of Meeting. It is expected that the solicitation will be by mail, e-mail, fax, Internet web site, telephone or in person by Officers and Directors of the Company. The cost of solicitation will be borne by the Company. The information contained herein is given as of 31 March 2006, unless otherwise indicated. All dollar figures set forth are expressed in United States Dollars. All accounting is done in accordance with Gibraltar Generally Accepted Accounting Principles (GAAP).

## 2. QUORUMS AND VOTING:

The authorised share capital of the Company is \$100,000, consisting solely of one class of common shares divided into 10,000,000 shares with par value of \$0.01 per share, of which 6,933,348 shares were outstanding at the close of business 31 March 2006.

Each holder of record of a common share as of the Record Date for the meeting is entitled to attend the meeting and to cast one vote for each share. Proxies are being accepted by hand delivery, mail, e-mail, fax, and the Company's Internet website at [www.wheeltug.gi](http://www.wheeltug.gi). Any resolution to be voted upon at the meeting must be approved by a majority of the votes cast, unless the Company's Articles of Association stipulate a number or proportion of the votes cast in excess of a majority. The meeting will proceed as long as there is a quorum at the meeting place including the voted proxies.

## 3. REVOCATION OF PROXIES:

Each shareholder has the power to revoke a proxy at any time as long as it has not been exercised. In addition to revocation in any other manner permitted by law, a member giving a proxy pursuant to this solicitation who wishes to revoke the proxy instrument may do so in writing. This revocation must be executed by the member, or by his attorney authorised in writing, or, if the member is a Corporation, under its Corporate seal or by an officer or attorney thereof duly authorised, and received by mailed, or deposited, at any office of the Company, via e-mail to [proxy@wheeltug.gi](mailto:proxy@wheeltug.gi), or by fax to +44.207.504.3593 at any time up to and including the last business day preceding the day of the meeting, or any adjournment thereof at which the proxy is to be used, or with the Chairman of such meeting on the day of the meeting, or adjournment thereof.

## 4. PRINCIPAL HOLDERS OF VOTING SHARES:

To the knowledge of the Directors and Officers of the Company there is no person who beneficially owns or exercises control or direction over shares carrying more than ten percent of the votes attached to shares of the Company as of 31 March 2006 except:

Chorus Motors plc owns 6,846,715 shares which is 98.7% of the outstanding shares. Chorus Motors plc is 79.1% owned by Borealis Technical Limited.

## 5. ELECTION OF DIRECTORS:

### Present Directors

Joseph J. Cox, MSFA  
Rodney T. Cox, Ph.D.  
Isaiah W. Cox, A.B.  
Wayne S. Marshall, Ph.D.

### Remaining Term

up for election  
up for election  
1 year  
2 years

The proxy will be voted for the following proposed nominees (or for a substitute nominee in the event of contingencies not known at present) who will serve for a period of 3 years, or their successors if they are elected or appointed in accordance with the Articles of Association of the Company. Respective reported share totals are as at 31 March 2006.

**JOSEPH J. COX** became a Director of the Company 30 January 2006. Mr. Cox became President and COO of WheelTug plc on 30 January 2006. Mr. Cox has been involved in the commercialization of several technologies in start-up company environments. While with Sabrix, Inc. (from November 2000 to June 2002), he guided the development of enterprise-level international transaction tax software which is now in use by HP, GE, Amazon, Cisco, DaimlerChrysler and others. He was also a Product Manager at PinPoint Corporation from March 1999 to September 2000. He has also been involved with the renewal of the Roche Bay iron ore project, which recently signed a development agreement with a major steel company. Mr. Cox is currently a Director of Borealis Exploration plc, Chorus Motors plc, Roche Bay plc and WheelTug plc. Mr. Cox has a Masters in Financial Analysis from Portland State University and a Bachelors of Arts in Intellectual History from the University of Pennsylvania. Joseph J. Cox beneficially owns directly or indirectly 100 shares of WheelTug plc.

**ISIAH W. COX** became a Director of the Company on 8 February 2005. He is currently also a Director of Borealis Exploration Limited, Borealis Technical Limited, Avto Metals plc, Cool Chips plc, Photon Power plc, Power Chips plc, Roche Bay Holdings Limited, Roche Bay Holdings (Barbados) Limited, Credits Holdings Limited, Borealis Roche Bay Limited, WheelTug plc, Cool Chips Military Sales plc, and Faraway plc. Mr. Cox is a Member of the Council of the Jeremiah Toyam Cox Foundation Limited and the Hart Cox Foundation Limited, among other foundations based in Gibraltar. Isaiah W. Cox beneficially owns directly or indirectly 2001 shares of WheelTug plc.

**THE PRESENT POSITION AND OFFICE WITH THE COMPANY IF APPLICABLE, AND THE PRESENT PRINCIPAL OCCUPATION OR EMPLOYMENT OF THE INCUMBENT DIRECTORS AND OFFICERS ARE AS FOLLOWS. UNLESS OTHERWISE STATED, SUCH OCCUPATION OR EMPLOYMENT HAS CONTINUED FOR MORE THAN THE LAST FIVE YEARS.**

**WAYNE S. MARSHALL** became a Director of the Company on 8 February 2005. He retired as a Professor of Business Administration from Long Island University, where he remains an Emeritus Professor. Dr. Marshall is Chairman of the Executive and Compensation Committees, and a member of the Audit Committee of the Company. He is currently also a Director of Borealis Exploration Limited, Borealis Technical Limited, Avto Metals plc, Cool Chips plc, Photon Power plc, Power Chips plc, Roche Bay Holdings Limited, Roche Bay Holdings (Barbados) Limited, Roche Bay plc, Credits Holdings Limited, Borealis Roche Bay Limited, WheelTug plc, Cool Chips Military Sales plc, and Faraway plc. Dr. Marshall is a Member of the Council of the VSBM Foundation Limited, among other foundations based in Gibraltar. Wayne S. Marshall beneficially owns directly or indirectly 1 share of WheelTug plc.

**RODNEY T. COX** became Chief Executive Officer on 8 February 2005. He is a member of the Executive, Audit and Compensation Committees. He was a Partner in The Parmenides Group until February 2000. He is currently also a Director of Borealis Exploration Limited, Borealis Technical Limited, Avto Metals plc, Cool Chips plc, Photon Power plc, Power Chips plc, Roche Bay Holdings Limited, Roche Bay Holdings (Barbados) Limited, Credits Holdings Limited, Borealis Roche Bay Limited, WheelTug plc, Cool Chips Military Sales plc, and Faraway plc. Dr. Cox is a Member of the Council of the Hart Cox Foundation Limited and the Jeremiah Toyam Cox Foundation Limited, among other foundations based in Gibraltar. Rodney T. Cox beneficially owns directly or indirectly 1 share of WheelTug plc.

**Fidecs Management Limited** became Corporate Secretary of the Company on 8 February 2005.

**6. APPOINTMENT OF AUDITORS:**

Unless otherwise specified therein, it is presently intended to vote the proxy to appoint Moore Stephens, Chartered Accountants, Gibraltar, as auditors of the Company, to hold office until the next annual meeting of shareholders, and to authorize the Directors to fix their remuneration.

**7. INSURANCE:**

The Company has liability insurance for its various offices and facilities worldwide. The Company indemnifies all of its Officers and Directors against any legal actions or threatened legal actions that are in any way related to their relationship to the Company. The indemnification includes paying all legal bills and all costs of any kind relating to any such claims.

**8. INTEREST OF LARGE SHAREHOLDERS IN MATERIAL TRANSACTIONS WITH THE COMPANY:**

Borealis Technical Limited collects a nominal annual retainer fee for managing the business of WheelTug plc, but pays all of WheelTug plc expenses. All funds raised by the sale of WheelTug plc shares go to Borealis Technical Limited, where they become an account payable to WheelTug plc.

**9. GENERAL:**

The Management knows of no matter to come before the Annual Meeting other than the matters referred to in the Notice of the Meeting. If any matters that are not now known to the Management should properly come before the meeting, the accompanying proxy instrument will be voted on such matters in accordance with the best judgment of the person or persons voting it.

The contents and sending of this information have been approved by the Directors of the Company.

Dated 10 June 2006

**WheelTug plc**

A handwritten signature in black ink, appearing to be 'R. T. Cox', written over a horizontal line.

Rodney T. Cox, Ph.D.  
CEO/Chairman of the Board

A handwritten signature in black ink, appearing to be 'Isaiah W. Cox', written over a horizontal line.

Isaiah W. Cox, A.B.  
President/COO

2006

# WheelTug plc

## NOTICE OF ANNUAL MEETING OF MEMBERS



NOTICE IS HEREBY GIVEN, that the Annual General Meeting of Members of WheelTug Public Limited Company will be held on Tuesday, the 20<sup>th</sup> day of June 2006, at the hour of 18:50 (Gibraltar time), at the offices of Fidecs Management Limited, 8-10 Queensway, Montague Pavilion, Gibraltar, and on the Internet at [www.wheeltug.gi](http://www.wheeltug.gi), for the purposes described in this Notice. Members are cordially invited to attend this meeting.

1. To elect 2 Directors, each for a 3-year term.
2. To appoint auditors for the year ending 31 March 2007.
3. To table the financial statements for the year ended 31 March 2006.
4. To approve and ratify all acts and resolutions of the Board of Directors since the last annual meeting of Members of the Company
5. To transact further and other business as may properly come before the meeting.

Dated this 30<sup>th</sup> day of May 2006.

By Order of the Board of  
**WheelTug plc**

Rodney T. Cox, Ph.D.  
Chairman of the Board

Isaiah W. Cox, A.B.  
Director

Members who are unable to attend the meeting in person are requested to date, sign, and return the enclosed form of proxy in the envelope provided for that purpose, or to fax it to +44.207.504.3593, or in the States to +1.503.296.2163 or any WheelTug office. The proxy will be available for voting on-line at the WheelTug website, [www.wheeltug.gi](http://www.wheeltug.gi) from 6 June 2006. The proxy will also be accepted if sent in electronic form to [www.wheeltug.gi](http://www.wheeltug.gi). Even if you plan on attending the meeting electronically, we would appreciate your proxy before the meeting and you will still be allowed to vote in person at the meeting. There is always a possibility that the phone lines or the Internet will be down at the time of the meeting and sending in the proxy ensures your vote will be counted. Please note: the audited financial statements and information circular will be available at: [www.wheeltug.gi/investor/corpinfo.shtml](http://www.wheeltug.gi/investor/corpinfo.shtml).



# WheelTug plc PROXY



## SOLICITED BY MANAGEMENT

I/We \_\_\_\_\_ being a member of the above Company with shares HEREBY APPOINT Rodney T. Cox, Isaiah W. Cox, Wayne S. Marshall, Joseph J. Cox and Fidecs Management Limited, each with full power to act without the others and each with full power of substitution, or in lieu of the foregoing \_\_\_\_\_ to be my/our proxy to vote for me/us at the meeting of members to be held in Gibraltar, and on the Internet at [www.wheeltug.gi](http://www.wheeltug.gi) on the 20<sup>th</sup> day of June 2006, at the hour of 18:50 hours (Gibraltar Time), or at any adjournment thereof.

- (a) VOTED FOR ( ) AGAINST ( ) WITHHELD FROM VOTING ( ) the election of **Rodney T. Cox**, Director, for a three year term.
- (b) VOTED FOR ( ) AGAINST ( ) WITHHELD FROM VOTING ( ) the election of **Joseph J. Cox**, Director, for a three year term.
- (c) VOTED FOR ( ) AGAINST ( ) WITHHELD FROM VOTING ( ) the appointment of **Moore Stephens, Chartered Accountants**, Gibraltar, for Auditors of the Company for the year ending 31 March 2007.
- (d) VOTED FOR ( ) AGAINST ( ) WITHHELD FROM VOTING ( ) to approve and ratify all acts and resolutions of the Board of Directors since the last annual meeting of the members of the Company.

Signed this \_\_\_\_\_ day of \_\_\_\_\_ 2006

«HOLDER\_1»  
«HOLDER\_2»  
«HOLDER\_3»  
«HOLDER\_4»  
«ADDRESS\_1»  
«ADDRESS\_2»  
«ADDRESS\_3»  
«CITY» «STATE» «ZIP\_CODE»  
«COUNTRY\_1»

Signature of Member (name to be written exactly as it appears to the left, or on your share certificate, or Signature of Member and Intermediary's Name in which the shares are held)

Number of shares owned: «shares»

For voting on-line, you will need: Username: «USERNAME» Password «PASSWORD»  
:

Shareholders are requested to confirm or provide the following information:

Citizenship: «CITIZENSHIP»

Occupation: «OCCUPATION»

Phone #: «PHONE»

Email: «EMAIL»

### NOTE:

- (1) EACH MEMBER HAS THE RIGHT TO APPOINT A PERSON, WHO NEED NOT BE A MEMBER, TO ATTEND AND ACT FOR HIM AND ON HIS BEHALF AT THE MEETING OTHER THAN THE PERSONS SPECIFIED ABOVE. Such right may be exercised by inserting the name of the person to be appointed in the space provided after "in lieu of the foregoing," or by completing another proper form of Proxy. Each Member can vote their Proxy and attend the Meeting and vote in person, or vote electronically. The Record Date for the meeting is 4 MAY 2006.
- (2) If this form of Proxy is to be utilized, it must be dated and signed by the member, or by an Attorney duly authorized in writing, or, if the member is a Corporation, under its Corporate Seal or under the hand of an Officer or Attorney thereof duly authorized. This Proxy is acceptable if sent by electronic form to [proxy@wheeltug.gi](mailto:proxy@wheeltug.gi), and also can be voted at the WheelTug Web Site [www.wheeltug.gi](http://www.wheeltug.gi) from 6 June 2006. Faxed copies are also acceptable if sent to +44.207.504.3593, or in the States to +1.503.296.2163, or any of the WheelTug corporate offices.
- (3) Unless otherwise specified, the shares represented by this Proxy instrument will be voted. If the choice is specified with respect to the matter to be dealt with at the meeting referred to above, such shares will be voted in accordance with the specifications made IF NO CHOICE IS SPECIFIED, it is presently intended to vote such shares for the approval of all matters set out in the Notice, including the election of RODNEY T. COX and JOSEPH J. COX, each for a 3-year term, and the appointment of MOORE STEPHENS, Chartered Accountants, as Auditors, and THIS PROXY CONFERS DISCRETIONARY AUTHORITY TO DO SO. This Proxy also confers authority for the above named to vote in his/her discretion with respect to amendments or variations to the matters identified in the Notice of Annual Meeting accompanying this Proxy instrument or matters which may properly come before the meeting.

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OFFICE OF THE SECRETARY  
CORPORATE AFFAIRS

# **WHEELTUG PUBLIC LIMITED COMPANY**

**Unaudited Financial Statements  
for the nine months ending 31 December 2006  
for the third quarter of Fiscal Year 2007**

## **WHEELTUG PUBLIC LIMITED COMPANY**

Registered No (Gibraltar) 94119

### **BALANCE SHEET**

As at 31 December 2006

	<b>31 December 2006</b>	<b>31 December 2005</b>
	<b>\$</b>	<b>\$</b>
<b>Current Assets</b>		
Debtors	69,333	69,333
<b>TOTAL NET ASSETS</b>	<b>\$69,333</b>	<b>\$69,333</b>
<b>LIABILITIES &amp; EQUITIES</b>		
Called up Share Capital	69,333	69,333
<b>Total Equity</b>	<b>69,333</b>	<b>69,333</b>
<b>TOTAL LIABILITIES</b>	<b>\$69,333</b>	<b>\$69,333</b>
<b>Total number of shares in issue</b>	<b>6,933,300</b>	<b>6,933,300</b>

# **WHEELTUG PUBLIC LIMITED COMPANY**

**Unaudited Financial Statements  
for the six months ending 30 September 2006  
for the second quarter of Fiscal Year 2007**

# **WHEELTUG PUBLIC LIMITED COMPANY**

Registered No (Gibraltar) 94119

## **BALANCE SHEET**

As at 30 September 2006

	30 September 2006 \$	30 September 2005 \$
<b>Current Assets</b>		
Debtors	69,333	69,333
<b>TOTAL NET ASSETS</b>	<b>\$69,333</b>	<b>\$69,333</b>
<b>LIABILITIES &amp; EQUITIES</b>		
Called up Share Capital	69,333	69,333
<b>Total Equity</b>	<b>69,333</b>	<b>69,333</b>
<b>TOTAL LIABILITIES</b>	<b>\$69,333</b>	<b>\$69,333</b>
<b>Total number of shares in issue</b>	<b>6,933,300</b>	<b>6,933,300</b>

# **WHELTUG PUBLIC LIMITED COMPANY**

**Unaudited Financial Statements  
for the three months ending 30 June 2006  
for the first quarter of Fiscal Year 2007**

## **WHEELTUG PUBLIC LIMITED COMPANY**

Registered No (Gibraltar) 94119

### **BALANCE SHEET**

As at 30 June 2006

	<b>30 June 2006</b>	<b>30 June 2005</b>
	<b>\$</b>	<b>\$</b>
<b>Current Assets</b>		
Debtors	<u>69,333</u>	<u>69,333</u>
<b>TOTAL NET ASSETS</b>	<b>\$ 69,333</b>	<b>\$ 69,333</b>
	<u><u>          </u></u>	<u><u>          </u></u>
<b>LIABILITIES &amp; EQUITIES</b>		
Called up Share Capital	<u>69,333</u>	<u>69,333</u>
<b>Total Equity</b>	<u>69,333</u>	<u>69,333</u>
	<u><u>          </u></u>	<u><u>          </u></u>
<b>TOTAL LIABILITIES</b>	<b>\$ 69,333</b>	<b>\$ 69,333</b>
	<u><u>          </u></u>	<u><u>          </u></u>
Total number of shares in issue	6,933,300	6,933,300



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# WheelTug plc

## 2006 Annual Report

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FLOOR OF THE EQUITY OFFICE  
CORPORATE FINANCE





# WHEELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

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## About WheelTug plc

WheelTug™ is a fully integrated ground propulsion system for aircraft. Built into the hubs of the nose wheels, it will give aircraft of all sizes full ground mobility (forward & reverse with steering) without turbines or external tugs. It will not require airframe modifications. The WheelTug will be powered by the Auxiliary Power Unit (APU) which, while technically a turbine, is designed for this kind of application. In June 2005, a demonstration system was successfully tested at an Evergreen Aviation facility in Arizona on a Boeing 767.

WheelTug plc was incorporated on February 5, 2005 to develop and commercialize WheelTug technology. WheelTug plc is a majority-owned subsidiary of Chorus Motors plc (CHOMF OTC-US).

## Contents

Management's Letter to Shareholders	3
Management Discussion and Analysis	4
Officers and Directors	6
Directors' Report	7
Auditors' Report	11
Financial Statements and Notes	13

# WHEELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

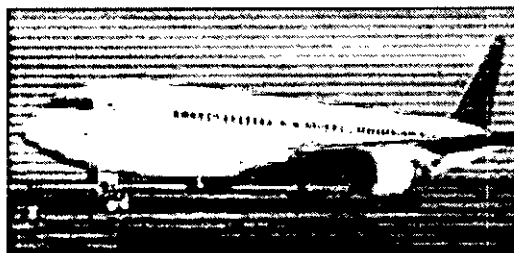
## Management's Letter to Members

14 June 2006

Fellow Members:

Thirty months from when WheelTug is funded, a revolution in aerospace will begin.

It might seem like a minor thing at the time, one small device installed on a single aircraft, but the impact will be huge. That small device will be a WheelTug – a pair of motors installed in the nose wheels of an airliner. Those motors have the power to move the plane on the ground, and transform airport operations.



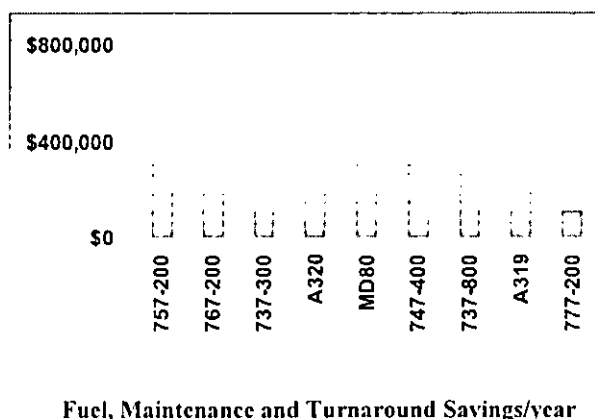
WheelTug Demonstrator Moving a Boeing 767

Today's jet airliners are incredible examples of human ingenuity. Traveling through the sky at hundreds of miles per hour, they carry millions of passengers each day. But on the ground, their very power is their undoing. Every minute on the ground, even smaller airliners like 737s burn tens of pounds of fuel. When they pull into gates, they are trapped until cumbersome tugs can push them back. And the strength of their engines creates hazards for the vehicles, buildings and people who surround them. Taxiing aircraft are like penguins out of water: their strengths, and the perfection of their design, become awkward at best.

WheelTug changes all of that. Made up of two motors, one in each of the front wheels, WheelTug will give aircraft on the ground full mobility without the use of jet engines or tugs. WheelTug will give airliners on the ground the efficiency, flexibility and grace that they now lack. Powered by the aircraft's existing auxiliary power unit, WheelTug will consume a fraction of the fuel and emit a fraction of the pollution of jet engines. It will also reduce turbine maintenance by reducing turbine use. WheelTug can push the aircraft both forward and back – releasing it from dependency on cumbersome and inefficient ground tugs. And, finally, WheelTug eliminates the use of jets in the gate area. The immediate safety benefits – a lack of jet blast, a cut in noise, an improvement in predictability – are palpable. But the knock-on effects are transformational. The aerospace industry is filled with visions of a reinvented gate – a gate without ground vehicles. These visions have been held back because airlines have been unable to eliminate the use of jets and tugs in the gate area. With WheelTug, these visions can become a reality.

In thirty months, two little electric motors can unleash a transformation. Immediately, fuel use, maintenance costs and turnaround times will be cut. A single WheelTug system installed on an average 757-200 unlocks savings of \$775,000/yr. Not long after, the use of WheelTug will unleash a creative torrent which will totally redefine ground operations – cutting costs, improving efficiency and recreating the passenger experience.

Your company has a bright future ahead. By our estimates, the total present value of this venture using a 20% discount rate is somewhere between \$1.0 billion and \$1.7 billion USD.



# WHEELTUG PUBLIC LIMITED COMPANY

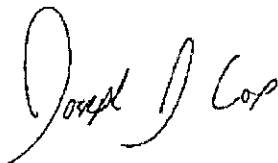
Gibraltar Registered No. 94119

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At this point, your company has a unique and well-protected technology, a powerful vision, a solidly established business case and a clear path forward.

To learn more visit our website ([www.wheeltug.gi](http://www.wheeltug.gi)) and go to the *Get Involved* section.

WheelTug plc



Joseph J. Cox  
COO/President



Rodney T. Cox  
Chairman

## Management's Discussion and Analysis of 2006 Results

All of our bills during 2006 were paid by Chorus Motors plc, and as such we have no debt or accounts payable.

Our parent company, Chorus Motors plc, owes us \$69,333. This sum is the sole financial asset in the balance sheet. Our key asset is the rights to the Chorus® Motor technology in moving aircraft on the ground. This asset as well as the expertise of Chorus and WheelTug personnel is carried at a zero value on the books.

When your company completes major sales of product and/or sales of shares and is able to stand alone, we do not intend to be reliant on our majority shareholder for absorbing most of the development costs and operating funding. That said we expect significant funding from our majority shareholder from the sale of WheelTug plc shares it owns in excess of the 5.2 million shares of WheelTug that are its base holding in WheelTug plc.

The current Business Plan calls for WheelTug plc management to arrange and manage a significant funding event in the near future, allowing for the completion and subsequent certification of WheelTugs for use in moving aircraft on the ground.

We are planning, with a demonstration of a flyable WheelTug, to expend the funds necessary to seek a share listing on the AIM exchange or another European exchange.

## Investor Information

Extensive information for investors can be found on our Website at [www.wheeltug.gi](http://www.wheeltug.gi). Our reports are posted there, as well as full information about the Company and our technologies.

If you have a question about WheelTug, please write to us at [pr@wheeltug.gi](mailto:pr@wheeltug.gi).

## Forward-Looking Statement

The discussion of WheelTug plc's ("WheelTug") business and operations includes, in several instances, forward-looking statements that are based upon WheelTug's management's and advisors' good faith assumptions relating to the financial, market, operating and other relevant environments that will exist and affect WheelTug's business and operations. All technical, scientific, and commercial statements regarding technologies and their impacts are based on the educated judgment of the WheelTug's technical and scientific staff, advisors, and consultants. No assurance can be made that the assumptions upon which management based its forward-looking statements will prove to be correct or that the WheelTug's business and operations will not be affected in any substantial manner by other factors not currently foreseeable by management or beyond the WheelTug's control.

All forward-looking statements involve risks and uncertainty. WheelTug undertakes no obligation to publicly release the result of any revisions to these forward-looking statements that might be made to reflect the events or circumstances after the date hereof, or to reflect the occurrence of unanticipated events; including those described herein, and such statements shall be deemed in the future to be modified in their entirety by the WheelTug's public pronouncements, including those contained in all future reports and other documents filed by the WheelTug with the relevant securities commissions.

# WHEELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

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## DIRECTORS AND OFFICERS

### Directors

### Appointed

Rodney T. Cox	09 February 2005	Director, Chairman of the Board
Isaiah W. Cox	09 February 2005	Director, Chief Executive Officer
Wayne S. Marshall	09 February 2005	Director
Robert T. Bauer	09 February 2005	(resigned 22 July 2005)

Stuart Harbron	09 February 2005	Chief Patent Officer
James Magdych	09 February 2005	Chief Information Officer

### Secretary

Fidecs Management Limited  
Appointed 09 February 2005

### Registered Office

Suite 3G, Eurolife Building  
1 Corral Road  
Gibraltar

### Auditors

Moore Stephens  
Suite 5 Watergardens 4  
Waterport  
Gibraltar

# WHEELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

## DIRECTORS' REPORT

The directors submit their report and the audited financial statements for the year ended 31 March 2006.

### Corporate Profile

The Company was incorporated in Gibraltar on 9 February 2005.

### Activities

The company is a licensee of Borealis Technical Technologies for the use of the Chorus Motor system for moving aircraft on the ground. The company has been developing the marketing and business planning for this venture and has begun discussions with potential customers.

### Results and Review of Business

WheelTug plc is a member of the Borealis Family of Companies and is an indirect majority-owned subsidiary of Borealis Exploration Limited and a direct subsidiary of Chorus Motors plc. Chorus Motors plc owns 6,846,145 of our 6,933,348 outstanding shares, or 98.78% of our shares. Like our parent and many of our Family Companies, WheelTug plc is incorporated in Gibraltar.

WheelTug plc has carried out extensive design, integration and testing work for WheelTug™. A major program carried out with the Boeing Company was successfully completed in fiscal 2006 and announced by The Boeing Company on 1 August 2005:

#### **Boeing Demonstrates New Technology for Moving Airplanes on the Ground**

**SEATTLE, Aug. 01, 2005** – The Boeing Company [NYSE: BA] and Chorus Motors have demonstrated an exploratory technology that could lead to a more efficient way of moving airplanes when they are on the ground at airports.

Successful tests in June of an onboard electric motor attached to the nose wheel of a Boeing 767 have shown that it may be a viable way of powering airplanes to move in and around gates, largely eliminating the use of airport tow tugs and jet engines now serving this purpose, as well as reducing emissions.

"We are striving to help our aerospace customers operate more efficiently, cleanly and quietly at airports," said Jim Renton, a director of Technology Integration in Boeing Phantom Works, the company's advanced research and development unit. "Our testing has shown that onboard electric motors can be very useful in achieving that goal if packaging, weight and flight-related technical issues identified during these tests can be resolved."

"We believe onboard electric motors have a great many advantages," added Bob Carman, Chorus Motors' WheelTug™ program manager. "They could reduce the need for ground tugs and their associated costs, allow faster flight turnarounds and increased fuel efficiency per trip, and reduce airplane noise and emissions at airports, to name just a few advantages."

Phantom Works researchers, together with those from Chorus Motors, a developer of innovative electric motor technologies, have worked together this year to design, build and operate a prototype onboard electric drive system that may enable pilots of large airplanes to be in complete control of their airplanes from gate to gate.

In June, the Phantom Works/Chorus Motors team, in cooperation with Air Canada, installed an electric motor drive on an Air Canada 767 and conducted a series of successful tests. Air Canada pilots performed ground maneuvers on slopes and terrains typical of those at airports around the world, including driving in reverse from a gate and taxiing forward to a runway. Tests also were performed at

# WHEELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

ramp temperatures exceeding 120 degrees Fahrenheit and at loads of up to 94 percent of the maximum takeoff weight for the airplane.

"Powered nose wheels have very positive benefits and I am quite impressed with the potential of the electric motor technology," said Capt. Hugh Campbell, director of Pilot Qualifications at Air Canada, who participated in the testing with Air Canada's chief 767 pilot, Capt. Richard Burke.

Next steps involve working to successfully resolve the technical issues that surfaced during the tests in order to define a path for commercial system installation.

Boeing Phantom Works is the advanced R&D unit of The Boeing Company. As an element of Boeing Technology, it provides advanced system solutions and innovative, breakthrough technologies that reduce cycle time and cost while improving the quality and performance of aerospace products and services. In addition to its own development work, Phantom Works collaborates with universities, companies, and organizations around the globe to ensure it is finding the best technology solutions the world has to offer.

Chorus Motors plc (US OTC: CHOMF), a developer of proprietary electric motor technologies, is a subsidiary of Borealis Exploration Limited (US OTC: BOREF). The Chorus systems produce high torque at start-up speeds and can be used in applications in aircraft, automobiles, trucks, locomotives, and ships. A wholly-owned subsidiary of Chorus Motors plc, WheelTug plc, has been assigned rights for aerospace applications of the Chorus family of motor technologies. For more information, see [www.chorusmotors.gi](http://www.chorusmotors.gi).

Since this successful test with the Boeing Company, WheelTug has established a path for development and carried out extensive market analysis to identify ideal aircraft platforms and customers. We are beginning to implement this path by approaching potential airline customers and expanding our engineering staff. We have a detailed business plan that is available under NDA for industry participants and for investors to evaluate the WheelTug Technology and its value.

These financial statements have been prepared in accordance with Gibraltar GAAP (generally accepted accounting principles), with the assumption that the Company will be able to realize its assets and discharge its liabilities in the normal course of business rather than through a process of forced liquidation. As of 31 March 2006, the Company had net assets of \$69,333 and to date has relied on the support of Borealis, which is also in the development stage. The Company's only asset at year end was the contract with Borealis Technical and Chorus Motors. The continued operation and growth of the Company is dependent on its ability to receive continued financial support from its parent company and/or to develop potential joint venture partners, development partners, or investors. The financial statements do not contain any adjustments that might be necessary if the Company is unable to continue as a going concern.

## Dividends

There were no dividends declared during the year.

# WHELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

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## Directors and their Interests

The directors who served during the year were as stated on page 8.

The interests of the directors in the shares of the Company in the year were as follows.

### Shares held at 31 March 2006

Rodney T. Cox	1
Wayne Marshall	201
Isaiah Cox	2001

## Share Options

As of 31 March 2006, there were no share options outstanding.

## Directors' Responsibilities

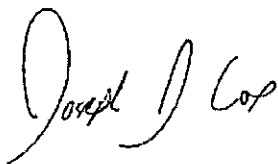
The directors are responsible for preparing financial statements for each financial year which give a true and fair view of the state of affairs of the Company at the end of the financial year and of the profit or loss for that year and which comply with the Gibraltar Companies Ordinance 1930 and the Gibraltar Companies (Accounts) Ordinance 1999. In preparing the financial statements, appropriate accounting policies have been used and applied consistently, reasonable and prudent judgments and estimates have been made, and applicable accounting standards have been followed. The directors are responsible for maintaining adequate accounting records, for safeguarding the assets of the Company, and for preventing and detecting fraud and other irregularities.

## Auditor

A resolution to reappoint Moore Stephens will be proposed at the Annual General Meeting.

By order of the Board on 14 June 2006

WheelTug plc



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Joseph J. Cox  
Director



---

Isaiah W. Cox  
Director



# **WHEELTUG**

**PUBLIC LIMITED COMPANY**

Gibraltar Registered No. 94119

## **Financial Statements**

**for the year ended 31 March 2006**

# **WHEELTUG PUBLIC LIMITED COMPANY**

Gibraltar Registered No. 94119

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## **INDEPENDENT AUDITORS' REPORT TO THE MEMBERS OF WHEELTUG PUBLIC LIMITED COMPANY**

We have audited the financial statements of WheelTug plc for the year ended 31 March 2006 set out on pages 13 to 15. These financial statements have been prepared under the historical cost convention and the accounting policies set out on page 14.

This report is made solely to the Company's members as a body, in accordance with the Companies Ordinance 1930. Our audit work has been undertaken so that we might state to the Company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Company and the Company's members as a body, for our audit work, for this report, or for the opinions we have formed.

### **Respective responsibilities of directors and auditors**

As described in the report of the Directors, the Company's Directors are responsible for the preparation of financial statements in accordance with applicable law and Gibraltar Accounting Standards (Gibraltar Generally Accepted Accounting Practice).

Our responsibility is to audit the financial statements in accordance with relevant Gibraltar legal and regulatory requirements and International Standards on Auditing (UK and Ireland).

We report to you our opinion as to whether the financial statements give a true and fair view and are properly prepared in accordance with the relevant financial reporting framework and are properly prepared in accordance with Gibraltar Law. We also report to you if, in our opinion, the Directors' Report is not consistent with the financial statements, if the company has not kept proper accounting records, or if we have not received all the information and explanations we require for our audit.

We read the Directors' Report and other information contained in the Annual Report and consider the implications for our report if we become aware of any apparent misstatements within it or material inconsistencies with the financial statements.

### **Basis of opinion**

We conducted our audit in accordance with International Standards on Auditing (UK and Ireland). An audit includes examination, on a test basis, of evidence relevant to the amounts and disclosures in the financial statements. It also includes an assessment of the significant estimates and judgements made by the directors in the preparation of the financial statements and of whether the accounting policies are appropriate to the Company's circumstances, consistently applied and adequately disclosed.

We planned and performed our audit so as to obtain all the information and explanations which we considered necessary in order to provide us with sufficient evidence to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or other irregularity or error. In forming our opinion we also evaluated the overall adequacy of the presentation of information in the financial statements.

In forming our opinion, we have considered the disclosures made in Note 1 of the financial statements in connection with the application of the going concern basis and the uncertainty with regards to securing continued financial support.

In connection with the other information contained in the Annual Report we also draw attention to the content of the Forward-Looking Statement on page 5.

# WHEELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

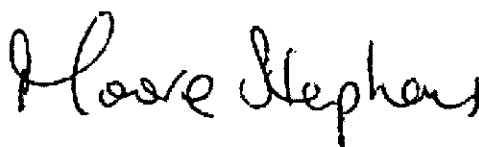
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## AUDITORS' REPORT (Continued)

In view of the significance of these matters we consider they should be drawn to your attention but our opinion is not qualified in these respects.

### Opinion

In our opinion the financial statements give a true and fair view of the state of affairs of the Company as at 31 March 2006, in accordance with Gibraltar Accounting Standards and have been properly prepared in accordance with Gibraltar Companies Ordinance 1930, the Gibraltar Companies (Accounts) Ordinance 1999, and the Gibraltar Companies (Consolidated Accounts) Ordinance 1999.



Gibraltar  
14 June 2006

Moore Stephens  
CHARTERED ACCOUNTANTS

# WHELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

## BALANCE SHEET as at 31 March 2006

	Notes	31 March, 2006 \$	31 March, 2005 \$
<b>Current Assets</b>			
Due from Parent (Chorus Motors plc)	1, 2	69,333	69,333
<b>Total Current Assets</b>		<u>\$ 69,333</u>	<u>\$ 69,333</u>
<b>TOTAL ASSETS</b>		<u><u>\$ 69,333</u></u>	<u><u>\$ 69,333</u></u>
<b>LIABILITIES &amp; EQUITY</b>			
<b>Equity</b>			
Called up Share Capital	3, 4	69,333	69,333
<b>Total Equity</b>		<u>\$ 69,333</u>	<u>\$ 69,333</u>
<b>TOTAL LIABILITIES &amp; EQUITY</b>		<u><u>\$ 69,333</u></u>	<u><u>\$ 69,333</u></u>

At present the company is in the development and financing stage and all income and expenditure is reflected in the accounts of the ultimate parent company. Consequently there is no profit and loss account.

Signed on behalf of the Board of Directors on 14 June 2006



Isaiah W. Cox  
Director



Rodney T. Cox  
Director

The notes on pages 14 to 15 form part of these Financial Statements.

# WHEELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

---

## NOTES TO THE FINANCIAL STATEMENTS for the year ended 31 March 2006

### 1. PRINCIPAL ACCOUNTING POLICIES

The financial statements have been prepared in accordance with Gibraltar Accounting Standards and the Gibraltar Companies Ordinance 1930 and the Gibraltar (Companies Accounts) Ordinance 1999 (together, 'Gibraltar GAAP').

**a. Basis of accounting**

The financial statements are prepared in accordance with the historical cost convention.

**b. Reporting currency**

The Company's financial statements are presented in US dollars, which is the functional currency for operations.

**c. Foreign currency translation**

Transactions in foreign currency are recorded at the rate at the date of the transaction. Any monetary assets or liabilities denominated in foreign currencies are retranslated at the rate of exchange ruling at the balance sheet date.

**d. Consolidation**

Consolidated accounts are not presented since the accounts of the company and its subsidiaries are consolidated in the accounts of the ultimate parent company.

**e. Going Concern**

These financial statements have been prepared under the going concern concept, which assumes that the Company will continue in operational existence for the foreseeable future having adequate funds to meet their obligations as they fall due. Further information is set out in the Directors' Report on pages 7 to 9.

**f. Cash Flow Statements**

The Company meets the size criteria for a small company set by the Companies Act 1985, and therefore, in accordance with FRS1: Cash Flow Statements, it has not prepared a cash flow statement.

### 2. DEBTORS

	2006	2005
	\$	\$
Loan to parent company	\$ 69,333	\$ 69,333

Amounts due from the Company's parent company are non-interest bearing, unsecured, and with no fixed terms of repayment

# WHELTUG PUBLIC LIMITED COMPANY

Gibraltar Registered No. 94119

## NOTES TO THE FINANCIAL STATEMENTS for the year ended 31 March 2005 (Continued)

### 3. CALLED UP SHARE CAPITAL

		2006	2005	
		\$	\$	
Authorised share capital				
10,000,000 ordinary shares @ \$0.01 each		\$ 69,333	\$ 69,333	
	Number of Shares	Share Capital \$	Share Premium Account \$	Total \$
Shares issued	6,933,348	69,333	-	69,333
At 31 March 2005	6,933,348	69,333	-	69,333
Shares issued during the year	-	-	-	-
At 31 March 2006	6,933,348	69,333	-	69,333

### 4. RECONCILIATION OF MOVEMENTS IN SHAREHOLDERS FUNDS

	Share Capital \$	Share Premium Account \$	Total \$
Shares issued during the year			
Loss for the year	69,333	-	-
At 31 March 2005	69,333	-	69,333
Shares issued during the year	-	-	-
Profit for the year	-	-	-
At 31 March 2006	69,333	-	69,333

At present all income and expenditure is reflected in the accounts of the ultimate parent company and consequently there is no profit and loss account produced.

### 5. ULTIMATE PARENT COMPANY

The ultimate parent company is Borealis Exploration Limited, a company incorporated in Gibraltar whose registered office is at Suite 3G, Eurolife Building, 1 Corral Road, Gibraltar

# WheelTug plc

Registered in Gibraltar, number 94119  
Montagu Pavilion  
8-10 Queensway  
Gibraltar

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CORPORATE FINANCE

## Certification:

These financial statements, and the notes thereto, are based on the best information currently available to the Company, and to the best of my knowledge present fairly, in all material respects, the financial position of the Issuer and the results of its operations and cash flow for the periods presented, in conformity with accounting principles generally accepted in Gibraltar and the United Kingdom, consistently applied.

WheelTug plc

/s/ Rodney T Cox

Rodney T Cox,  
Chairman

	Gibraltar	England	US	
Phone:	+350.59995	+44 207.101.9592	+1.503.621.3286	e-mail: <a href="mailto:exec@wheeltug.gi">exec@wheeltug.gi</a>
Fax:	+350.59059	+44 207.504 3593	+1.503.296.2163	<a href="http://www.wheeltug.gi">www.wheeltug.gi</a>

# **WHEELTUG PUBLIC LIMITED COMPANY**

**Unaudited Financial Statements  
for the nine months ending 31 December 2005  
for the third quarter of Fiscal Year 2006**

**prepared 19 January 2006**



# **WHEELTUG PUBLIC LIMITED COMPANY**

Registered No (Gibraltar) 94119

## **BALANCE SHEET**

As at 31 December 2005

	<b>31 December 2005</b>
	<b>\$</b>
<b>Current Assets</b>	
Debtors	69,333
	<hr/>
<b>Total Net Assets</b>	\$69,333
	<hr/> <hr/>
<b>Capital and Reserves</b>	
Called up Share Capital	69,333
	<hr/>
<b>Total Shareholders' Funds</b>	\$69,333
	<hr/> <hr/>
 Total number of shares in issue	 6,933,300

# WheelTug plc

Registered in Gibraltar, number 94119  
Montagu Pavilion  
8-10 Queensway  
Gibraltar

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CORPORATE FINANCE



## Certification:

These financial statements, and the notes thereto, are based on the best information currently available to the Company, and to the best of my knowledge present fairly, in all material respects, the financial position of the Issuer and the results of its operations and cash flow for the periods presented, in conformity with accounting principles generally accepted in Gibraltar and the United Kingdom, consistently applied.

WheelTug plc

/s/ Rodney T Cox

Rodney T Cox,  
Chairman

	Gibraltar	England	US	
Phone:	+350.59095	+44.207.101.9592	+1.503.621.3286	e-mail: <a href="mailto:exec@wheeltug.gi">exec@wheeltug.gi</a>
Fax:	+350.59059	+44.207.504.3593	+1.503.296.2163	<a href="http://www.wheeltug.gi">www.wheeltug.gi</a>

# **WHEELTUG PUBLIC LIMITED COMPANY**

**Unaudited Financial Statements  
for the six months ending 30 September 2005  
for the second quarter of Fiscal Year 2006**

# **WHEELTUG PUBLIC LIMITED COMPANY**

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Registered No (Gibraltar) 94119

## **BALANCE SHEET**

As at 30 September 2005

	30 Sept 2005 \$
<b>Current Assets</b>	
Debtors	69,333
	<hr/>
<b>Total Net Assets</b>	\$69,333
	<hr/> <hr/>
<b>Capital and Reserves</b>	
Called up Share Capital	69,333
	<hr/>
<b>Total Shareholders' Funds</b>	\$69,333
	<hr/> <hr/>
Total number of shares in issue	6,933,300

[Not Applicable, as the Company's shares will be listed only as of the Summer of 2007]

**Exhibit 2 - Information, Documents and Materials Distributed or Required to be Distributed to the Company's Shareholders since March 31, 2005**

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**Information,  
Document or Material**

**Time Period**  
prior to the date of the  
annual meeting

**By Whom**  
the Company's  
Memorandum and  
Articles of Association

**Manner** 7001 APR -5 A 9:43  
by mail to shareholders  
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Information Circular in  
connection with the  
Solicitation of Proxies  
for use at the 2006  
Annual Meeting

Notice of 2006 Annual  
Meeting of Members

not less than 21 days  
prior to the date of the  
annual meeting  
prior to or on the date of  
the annual meeting

the Company's  
Memorandum and  
Articles of Association  
the Company's  
Memorandum and  
Articles of Association

by mail to shareholders

2006 Proxy Statement

by mail to shareholders

**Exhibit 3 - Information, Documents and Materials Made or Required to be Made Public under  
Gibraltar Law since March 31, 2005**

**Information,  
Document or Material**

**Time Period**  
N/A<sup>1</sup>

**By Whom**  
N/A

**Manner**  
N/A

Unaudited Financial  
Statements for the nine  
months ending 31  
December 2006

Unaudited Financial  
Statements for the six  
months ending 30  
September 2006

N/A

N/A

N/A

Unaudited Financial  
Statements for the nine  
months ending 30 June  
2006

N/A

N/A

N/A

Annual Report and  
Audited Financial  
Statements for the fiscal  
year ending 31 March  
2006

within 90 days of the  
end of the fiscal year

the Registry

Filing with the Registry,  
which, in turn, makes  
the audited financial  
statements available for  
public inspection

Unaudited Financial  
Statements for the nine  
months ending 31  
December 2005

N/A

N/A

N/A

Unaudited Financial  
Statements for the six  
months ending 30  
September 2005

N/A

N/A

N/A

<sup>1</sup> N/A means that there is no requirement for the Company to make the relevant information public, but the Company does so on a voluntary basis.

**Exhibit 4 – Not yet applicable**

**Exhibit 6 - Press Releases issued by the Company since March 31, 2005**

<b>Title</b>	<b>Date Issued</b>	<b>Manner of Issuance</b>
Chorus Motors and WheelTug Announce Significant New Patents	23 October 2006	the Company released the press release to Market Wire for global distribution
Chorus Motors Reports Progress in WheelTug™ Development	12 September 2005	the Company released the press release to Market Wire for global distribution
Boeing Demonstrates New Technology for Moving Airplanes on the Ground	1 August 2005	the Company released the press release to Market Wire for global distribution



# CHORUS MOTOR

Chorus Motors Press Release Dated October 23, 2006

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## Chorus Motors and WheelTug announce significant new patents

Refers To:

BOREF Borealis Exploration Limited

CHOMF Chorus Motors plc

WheelTug plc

## CHORUS MOTORS AND WHEELTUG ANNOUNCE SIGNIFICANT NEW PATENTS

Gibraltar, 23 October 2006

Chorus Motors plc (OTC: CHOMF) and WheelTug plc are pleased to announce the recent issuance and publication of a number of United States and Patent Cooperation Treaty patents which help to reinforce their technological superiority in the marketplace of advanced motors and drives.

The Chorus® Motor and Drive technology combines the ruggedness and reliability of traditional 3-phase motors and drives with a novel high phase order control of the magnetic field. The use of high order windings promotes the beneficial use of harmonics over a wide range of motor speeds. In conventional motors these harmonics can parasitically deteriorate optimum performance. Instead, Chorus uses these harmonics to both greatly enhance power density as well as to lower cost for a wide range of traction applications such as starter-alternators.

"These patents show that Chorus has the high phase order field to itself, which gives us a tremendous advantage over any competition," said Nechama Cox, Chorus' Chief Operating Officer. "Chorus is superior for so many applications in terms of power density, performance and, for many applications, cost."

Chorus' strategy is to work with established providers in the motor and drive market, such as SEMIKRON, to deliver a finished product, which has both the Chorus technology, coupled with the impressive experience and expertise of world-class manufacturers. Initial markets which are being targeted include starter-generators, mining motors, and a broad swath of industrial motors and drives. The WheelTug™ system, which is being designed to fit inside the nosewheel of commercial aircraft and



allow pilots to taxi the airplane on the ground without the use of the main turbines or a tow-tug, is a particularly impressive display of the high power density of the Chorus motor technology.

The specific patents and published applications include:

**WO/2006/096446, MOTOR CONTROLLER**, is for a controller for use in moving aircraft on the ground using motors in the wheels. Included is the software architecture as well as the pilot interface. The approach uses several algorithms and control laws to operate the motors. Knowledge of the current operating state of the motors, together with knowledge of the commands given to taxi forward, taxi in reverse, or brake in reverse, is used to configure the motors to optimal operating parameters.

Technical advantages of this invention include : allowing the aircraft to taxi at an airport without the use of its main engines or a tug; reducing fuel costs, pollution and noise levels,- increasing payload capacity and/or range; and placing aircraft completely under pilot control thereby saving money and simplifying logistics.

**WO/2006/065988, MOTOR WINDING**, is for a motor in which stator coils are wound around both the inside and outside of the stator, allowing for an entirely new geometry for Chorus machines: a toroidal design in which each coil is its own phase. Such a design allows for numerous advantages which other motors cannot achieve: elimination of cross- stator end turns, leading to a reduction in the total length of the winding conductor; layering of the conductors in an ordered fashion; utilization of a lower voltage between each turn, giving better insulation life; deployment of a thin insulator between each layer, almost creating a 'formed coil'; and permitting the use of square wire inserted into the slot, giving very good conductor fill. A further technical advantage of the present invention is that it is particularly useful in conjunction with more than three phases. In particular, when the machine is wound with a low base pole count, eg  $B=2$ , higher order harmonic drive waveforms may be used instead of a high base pole count to produce a high pole count. The toroidal design eliminates the end turn copper associated with bulky end turns for large machines having low base pole count designs.

This design allows for some specific advantages in any application where a longer, heavier motor is less desirable.

**WO/2006/078322, AIRCRAFT DRIVE**, is for a drive system for an aircraft involving one or more nose wheel motors. Data regarding the nose wheel rotation is used to control the ground travel of the aircraft, predict potential problems, provide more precise control over the aircraft, and improve aircraft safety.

**WO/2006/002207, HIGH PHASE ORDER AC MACHINE WITH SHORT PITCH WINDING**, is for a high phase order ac motor having an inverter drive that provides more than three phases of drive waveform of

harmonic order H, and characterized by machine windings which have a pitch of less than 180 rotational degrees. This short pitch winding allows for a plurality of both odd and even order harmonics that may be used to drive the machine. Each harmonic may provide a different Vw, V/Hertz ratio, and chording factor. Thus in a mesh connected machine, both Vw and Kc affect the V/Hertz machine ratio controlling the torque output of the machine, with the Vw determining the V/Hertz ratio of the windings, and the Kc determining the effective turn count of the winding.

This patent has the advantage that high torque overload may be provided at low speeds whilst sufficient voltage is also provided for high-speed applications. Additionally, varying the phase angle difference across each motor phase by changing the harmonic applied by the inverter to the mesh connection, provides a change in Volts/Hz ratio through a logical change of the output synthesized by the inverter. This means that the motor may have a fixed electrical connection to the inverter. Another advantage of this patent is that the change in harmonic content may be obtained in a smooth fashion, successively passing through various admixtures of harmonic components.

And **US 7,075,265**, is for a patent which allows for desired low order harmonics which the Chorus technology uses beneficially, while filtering out many higher order spatial harmonics. This approach allows for an optimal combination of both harnessing low order harmonics, while eliminating many deleterious harmonics.

#### About Chorus Motors:

Chorus Motors plc (US OTC: CHOMF) is a majority-owned subsidiary of Borealis Exploration Limited (US OTC: BOREF). Chorus has developed the proprietary Chorus® Star and Chorus® Meshcon™ electric motor technologies, which offer substantial performance improvements over comparable motor and drive systems. The Chorus systems produce high torque at start-up speeds and are ideal for traction applications such as automobiles, trucks, locomotives, and ships. The WheelTug™ system is also suitable for aircraft ground manoeuvres and has been successfully tested in the form of an onboard aircraft nosewheel motor.

For more information, see [www.chorusmotors.gi](http://www.chorusmotors.gi)

For further information contact:

Chris Bourne  
Head of Public Relations  
Chorus Motors plc  
+44 (0)20 8571 5216  
[pr@chorusmotors.gi](mailto:pr@chorusmotors.gi)



# CHORUS MOTOR

Chorus Motors Press Release Dated September 12, 2005

ABOUT US

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## Chorus Motors Reports Progress in WheelTug(TM) Development

[http://www.marketwire.com/mw/release\\_html\\_b1?release\\_id=094984](http://www.marketwire.com/mw/release_html_b1?release_id=094984)

Refers To:  
BOREF Borealis Exploration Limited  
CHOMF Chorus Motors plc  
WheelTug plc

### CHORUS MOTORS REPORTS PROGRESS IN WHEELTUG™ DEVELOPMENT

Gibraltar, 12 September 2005

Chorus Motors plc(US OTC: CHOMF) and WheelTug plc confirmed today that they have designed an initial version of a WheelTug™ drive that can fit within the existing nose wheel hub of a 767-class aircraft, with the goal of largely eliminating the use of tow tugs and jet engines in moving aircraft on the ground.

As announced by The Boeing Company, in a Press Release on 1 August 2005

[http://www.boeing.com/news/releases/2005/q3/nr\\_050801a.html](http://www.boeing.com/news/releases/2005/q3/nr_050801a.html),

"Successful tests in June of an onboard electric motor attached to the nose wheel of a Boeing 767 have shown that it may be a viable way of powering airplanes to move in and around gates, largely eliminating the use of airport tow tugs and jet engines now serving this purpose, as well as reducing emissions."

The first significant step is to go from the proof-of-concept demonstrator as proven in the June tests, to a motor design which could approach the challenging goals of fitting entirely within existing nose gear, as well as being weight-neutral.

"The design we have gets us most of the distance of where we need to go in terms of the drive motor design itself," says Bob Carman, WheelTug's Program Manager. "There will remain a very considerable effort ahead of us with regards to refinements after performance testing, systems testing, integration, and certification, but getting the drive package the right shape and size and near the correct weight is a very

significant advance in bringing WheelTug to the product stage."

An economic analysis by WheelTug plc estimates that a typical WheelTug System would have a net present value to airlines of over \$6 million per airplane, though valuations would vary by aircraft type, utilization, and other factors. Savings are created by reduced turnaround times and lower fuel consumption, greenhouse gas emissions, ground equipment costs, damage to turbines and aircraft from foreign object debris and mishandling, maintenance costs, and noise. The analysis, which is based solely on publicly available information, can be found at <http://www.wheeltug.gi/value.php>.

While onboard electric drive motors for aircraft have been envisaged for decades, they have not been technically feasible due to the exceptionally high power density required. The Chorus Motor, which recently became available, delivers this exceptionally high power density. WheelTug plc, under its license from Chorus Motors, owns exclusive rights to this drive technology and control systems for aerospace applications.

The development of the WheelTug system thus far has been funded entirely by Chorus Motors, but in order to ensure rapid development, Chorus is now considering the sale of a substantial equity interest in WheelTug plc. Funds would be applied to final development and FAA certification process for the WheelTug system. No decision on such an equity placement has yet been made.

Chorus Motors plc (US OTC: CHOMF), a developer of proprietary electric motor technologies, is a subsidiary of Borealis Exploration Limited (US OTC: BOREF). The Chorus systems produce high torque at start-up speeds and can be used in applications in aircraft, automobiles, trucks, locomotives, and ships. A wholly-owned subsidiary of Chorus Motors plc, WheelTug plc, has been assigned rights for aerospace applications of the Chorus family of motor technologies. For more information, see [www.chorusmotors.gi](http://www.chorusmotors.gi), [www.wheeltug.gi](http://www.wheeltug.gi), [www.borealis.gi](http://www.borealis.gi).

Contact  
Isaiah Cox  
President  
WheelTug plc  
[Isaiah@wheeltug.gi](mailto:Isaiah@wheeltug.gi)  
+1 410-419-0082  
+44 (0) 207.993.4293

Forward Looking Statement at <http://www.chorusmotors.gi/fwdlook.shtml>





## **Boeing Demonstrates New Technology for Moving Airplanes on the Ground**

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**SEATTLE, Aug. 01, 2005** -- The Boeing Company [NYSE: BA] and Chorus Motors have demonstrated an exploratory technology that could lead to a more efficient way of moving airplanes when they are on the ground at airports.

Successful tests in June of an onboard electric motor attached to the nose wheel of a Boeing 767 have shown that it may be a viable way of powering airplanes to move in and around gates, largely eliminating the use of airport tow tugs and jet engines now serving this purpose, as well as reducing emissions.

"We are striving to help our aerospace customers operate more efficiently, cleanly and quietly at airports," said Jim Renton, a director of Technology Integration in Boeing Phantom Works, the company's advanced research and development unit. "Our testing has shown that onboard electric motors can be very useful in achieving that goal if packaging, weight and flight-related technical issues identified during these tests can be resolved."

"We believe onboard electric motors have a great many advantages," added Bob Carman, Chorus Motors' WheelTug™ program manager. "They could reduce the need for ground tugs and their associated costs, allow faster flight turnarounds and increased fuel efficiency per trip, and reduce airplane noise and emissions at airports, to name just a few advantages."

Phantom Works researchers, together with those from Chorus Motors, a developer of innovative electric motor technologies, have worked together this year to design, build and operate a prototype onboard electric drive system that may enable pilots of large airplanes to be in complete control of their airplanes from gate to gate.

In June, the Phantom Works/Chorus Motors team, in cooperation with Air Canada, installed an electric motor drive on an Air Canada 767 and conducted a series of successful tests. Air Canada pilots performed ground maneuvers on slopes and terrains typical of those at airports around the world, including driving in reverse from a gate and taxiing forward to a runway. Tests also were performed at ramp temperatures exceeding 120 degrees Fahrenheit and at loads of up to 94 percent of the maximum takeoff weight for the airplane.

"Powered nose wheels have very positive benefits and I am quite impressed with the potential of the electric motor technology," said Capt. Hugh Campbell, director of Pilot Qualifications at Air Canada, who participated in the testing with Air Canada's chief 767 pilot, Capt. Richard Burke.

Next steps involve working to successfully resolve the technical issues that surfaced during the tests in order to define a path for commercial system installation.

Boeing Phantom Works is the advanced R&D unit of The Boeing Company. As an element of Boeing Technology, it provides advanced system solutions and innovative, breakthrough technologies that reduce cycle time and cost while improving the quality and performance of aerospace products and services. In addition to its own development work, Phantom Works collaborates with universities, companies, and organizations around the globe to ensure it is finding the best technology solutions the world has to offer.

Chorus Motors plc (US OTC: CHOMF), a developer of proprietary electric motor technologies, is a subsidiary of Borealis Exploration Limited (US OTC: BOREF). The Chorus systems produce high torque at start-up speeds and can be used in applications in aircraft, automobiles, trucks, locomotives, and ships. A wholly-owned subsidiary of Chorus Motors plc, WheelTug plc, has been assigned rights for aerospace applications of the Chorus family of motor technologies. For more information, see [www.chorusmotors.gi](http://www.chorusmotors.gi).

###

**CONTACT INFO:**

**Tom Koehler**

Phantom Works Communications

Boeing

206-766-2923

[thomas.j.koehler@boeing.com](mailto:thomas.j.koehler@boeing.com)

**Bob Carman**

Program Manager for Aerospace Applications

Chorus Motors

805-908-1762

[rcarman@chorusmotors.gi](mailto:rcarman@chorusmotors.gi)

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OFFICE OF THE ATTORNEY GENERAL  
STATE OF NEW YORK

# **WHEELTUG PUBLIC LIMITED COMPANY**

**Unaudited Financial Statements  
for the three months ending 30 June 2007  
for the first quarter of Fiscal Year 2008**

# **WHEELTUG PUBLIC LIMITED COMPANY**

Registered No (Gibraltar) 94119

## **PROFIT AND LOSS ACCOUNT**

For the three months ended 30 June 2007

	<b>30 June 2007</b>	<b>30 June 2006</b>
	<b>\$</b>	<b>\$</b>
<b>Expenditure</b>		
Administration fees	70,000	--
Development Fees	43,476	--
	<hr/>	<hr/>
<b>Total Expenditures</b>	<b>\$ 113,476</b>	<b>--</b>
<b>Loss for the period</b>	<b>(113,476)</b>	<b>--</b>
<b>Accumulated loss brought forward</b>	<b>(193,105)</b>	<b>--</b>
	<hr/>	<hr/>
<b>Accumulated loss carried forward</b>	<b>\$ (306,581)</b>	<b>--</b>

# **WHEELTUG PUBLIC LIMITED COMPANY**

Registered No (Gibraltar) 94119

## **BALANCE SHEET**

As at 30 June 2007

	<b>30 June 2007</b>	<b>30 June 2006</b>
	<b>\$</b>	<b>\$</b>
<b>Current Assets</b>		
<b>Debtors</b>		
Due from Parent	<u>--</u>	<u>69,333</u>
<b>Current Liabilities</b>		
<b>Creditors - amounts due within one year</b>		
Due to Parent Company	<u>237,248</u>	<u>--</u>
Total Net Current Liabilities	<u>237,248</u>	<u>(69,333)</u>
<b>Total Net Assets / (Liabilities)</b>	<u><u>\$ (237,248)</u></u>	<u><u>\$ 69,333</u></u>
<b>Capital and Reserves Equity</b>		
Called up Share Capital	69,333	69,333
Profit and Loss Account	(306,581)	--
<b>TOTAL SHAREHOLDERS FUNDS</b>	<u><u>\$ (237,248)</u></u>	<u><u>69,333</u></u>

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US 3109324 A US 2631476 A

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Other  
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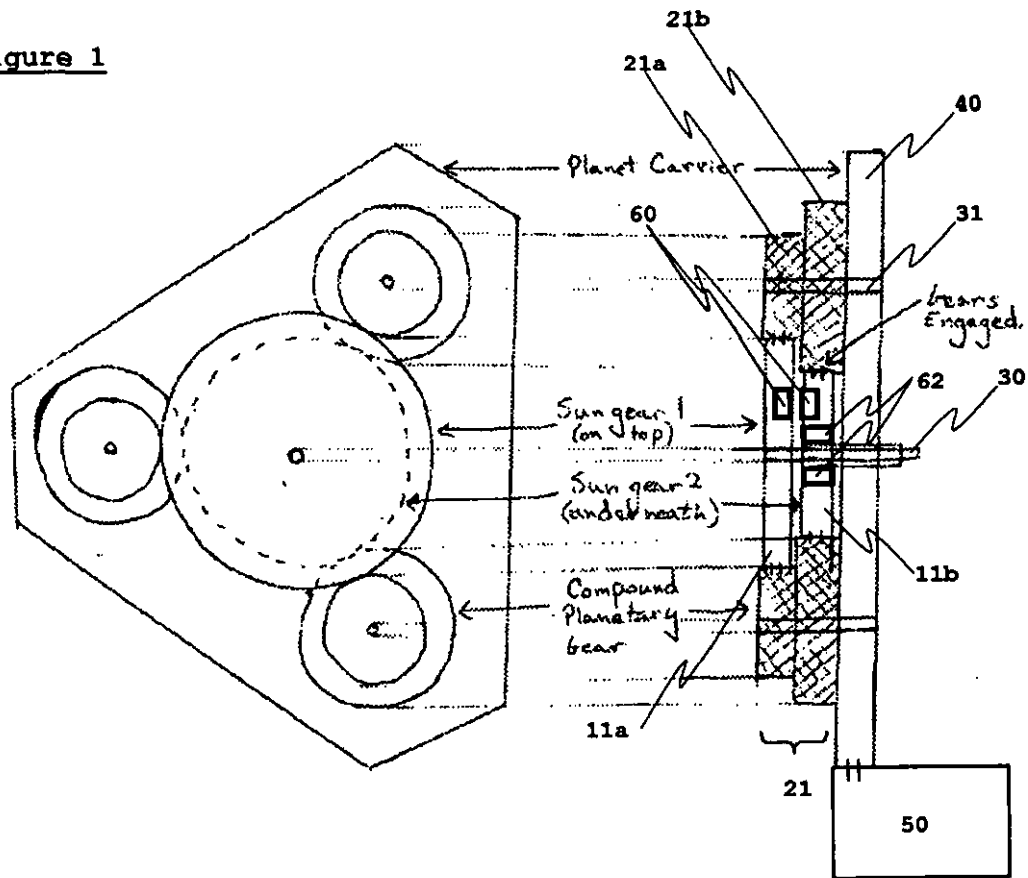
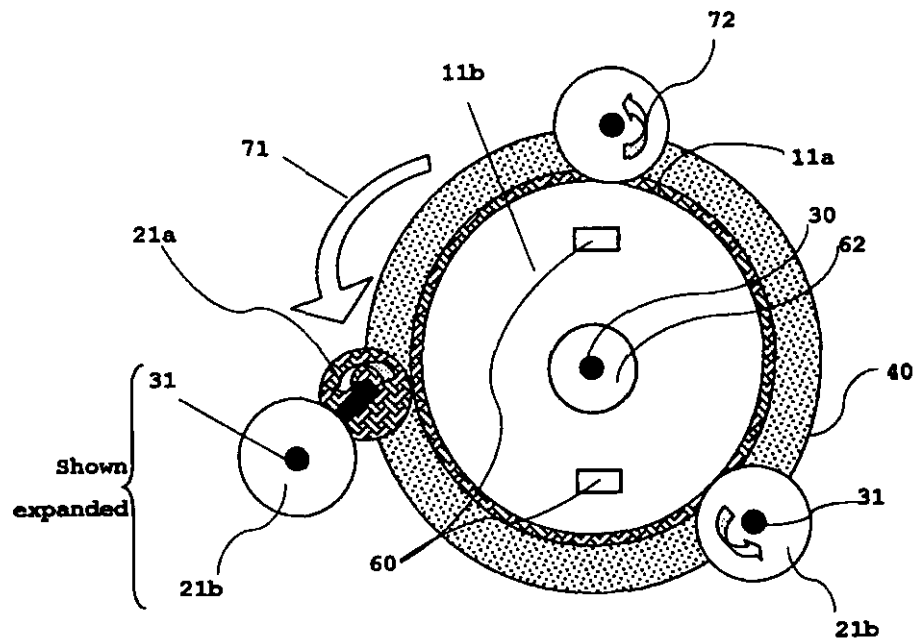
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Figure 1Figure 2

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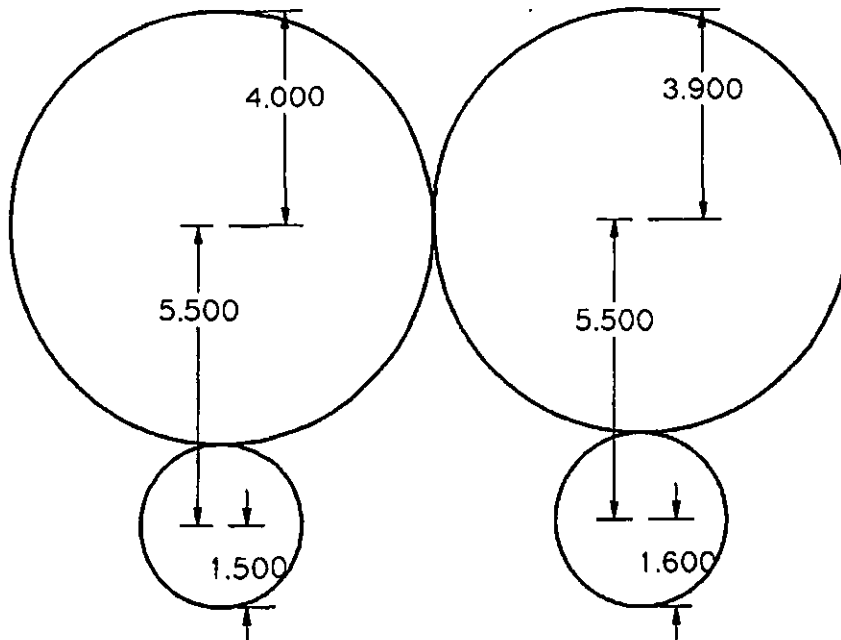
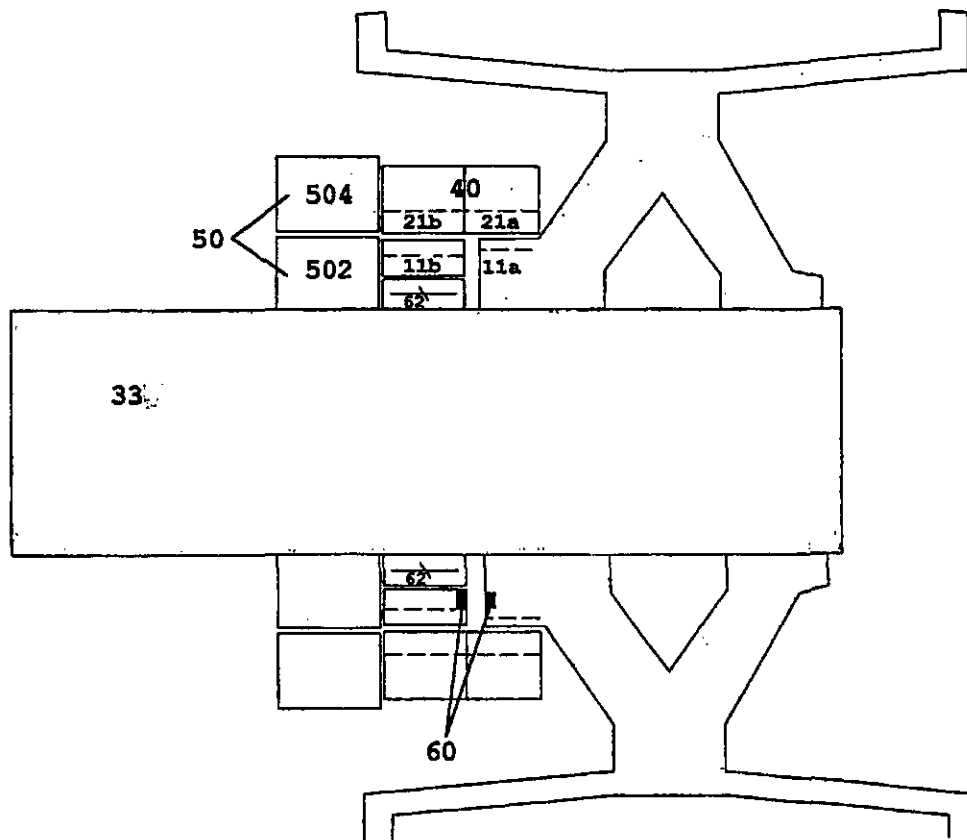
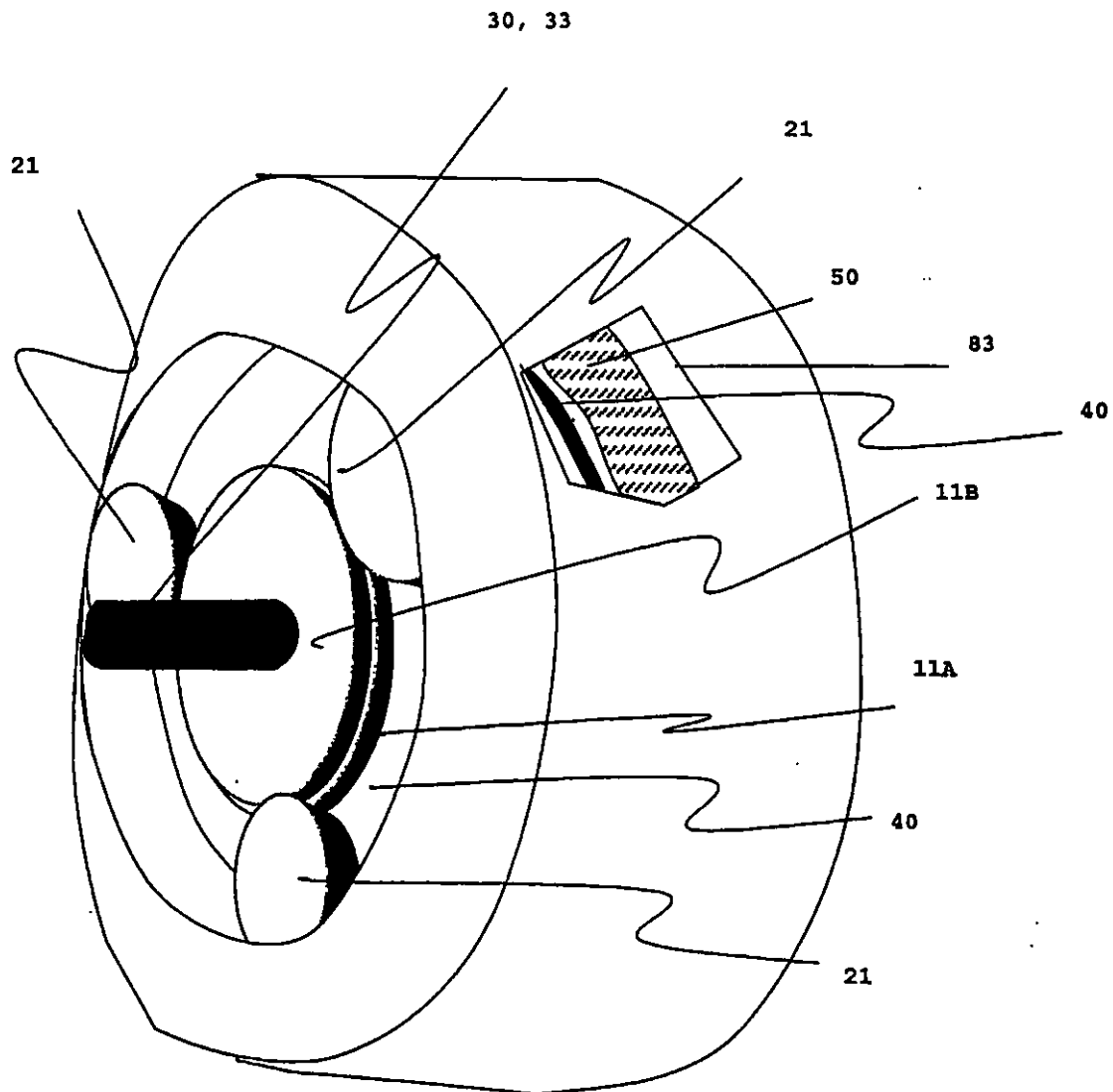
Figure 3Figure 4

Figure 5



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Figure 6A

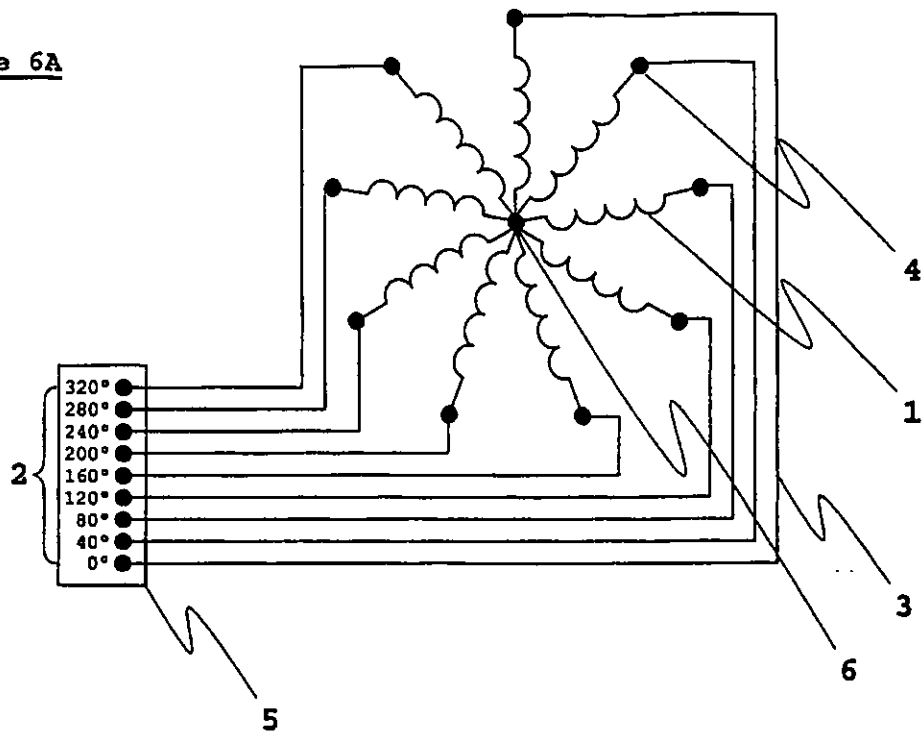


Figure 6B

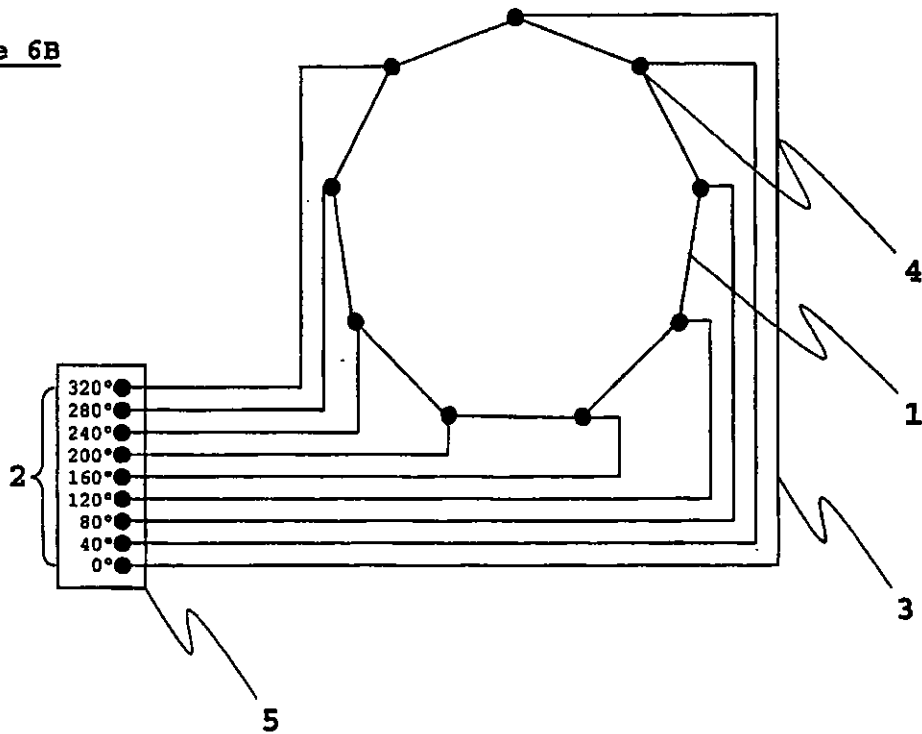




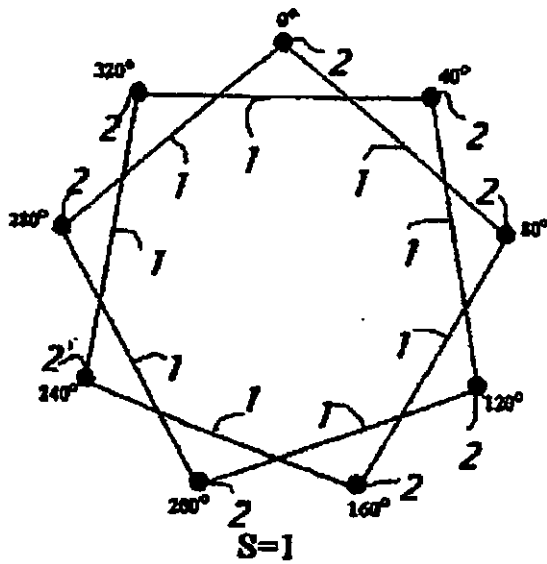
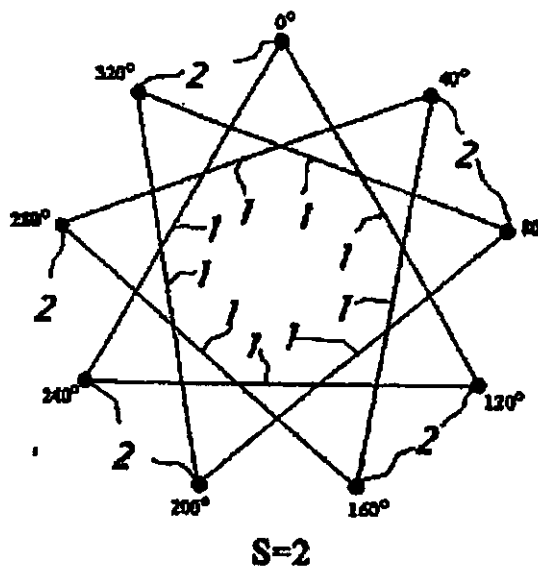
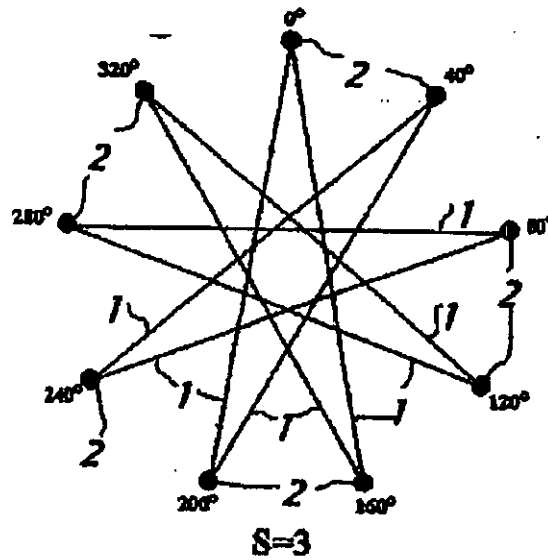
Figure 6CFigure 6DFigure 6E

Figure 7A

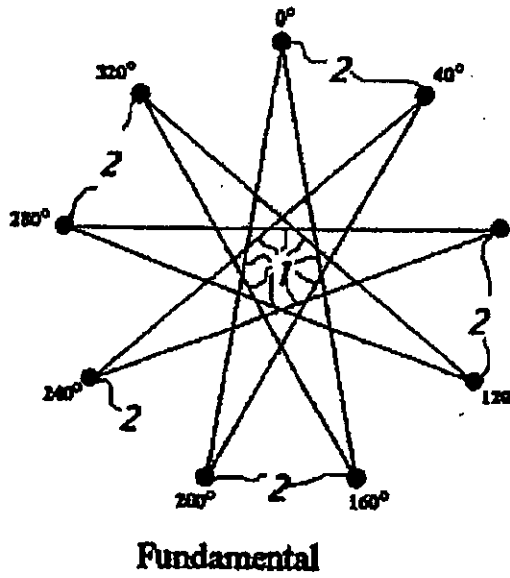


Figure 7C

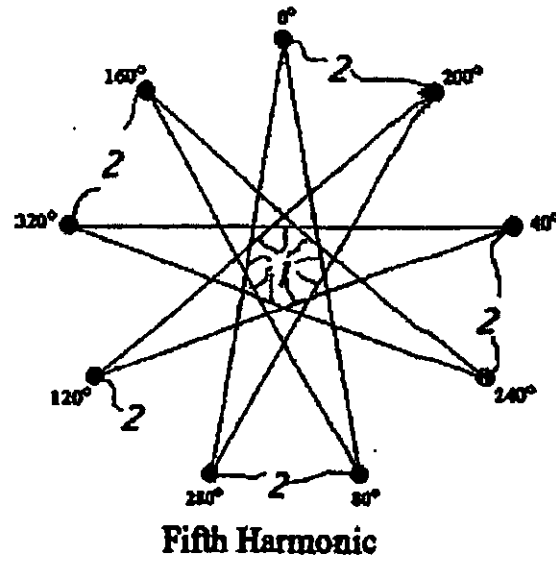


Figure 7B

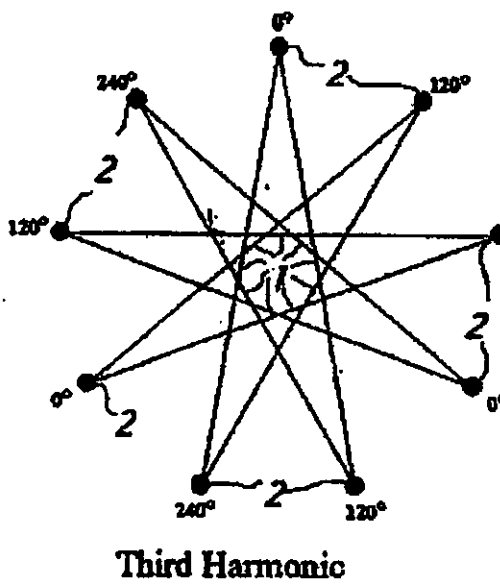


Figure 7D

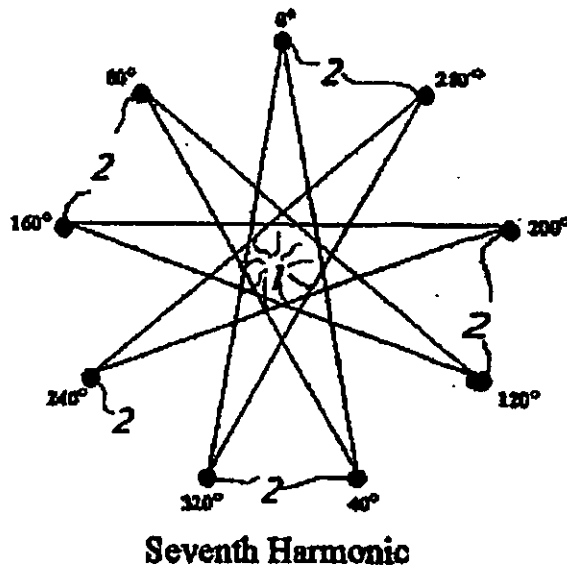


Figure 8

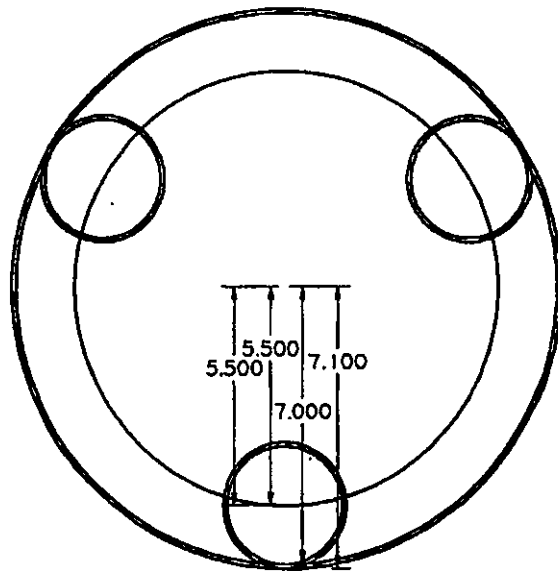
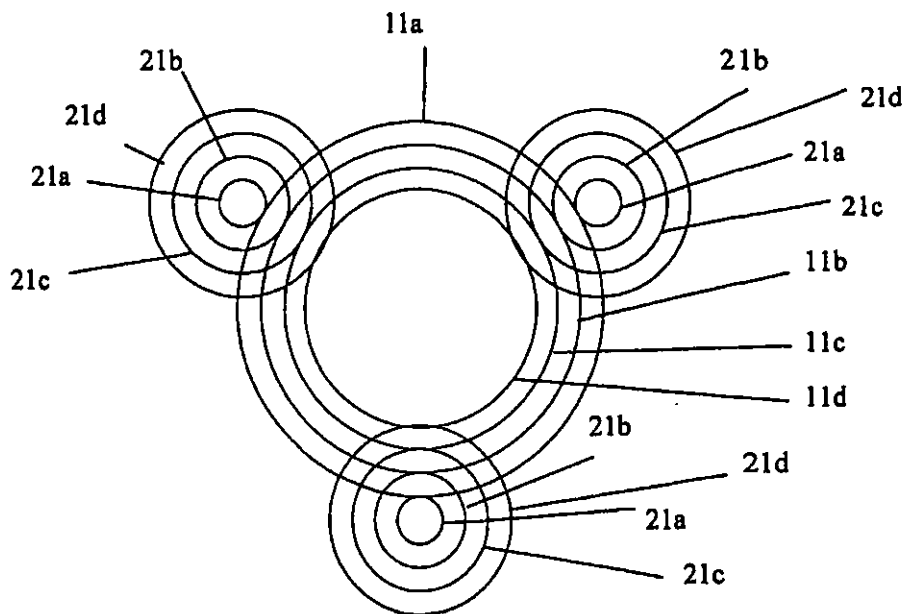
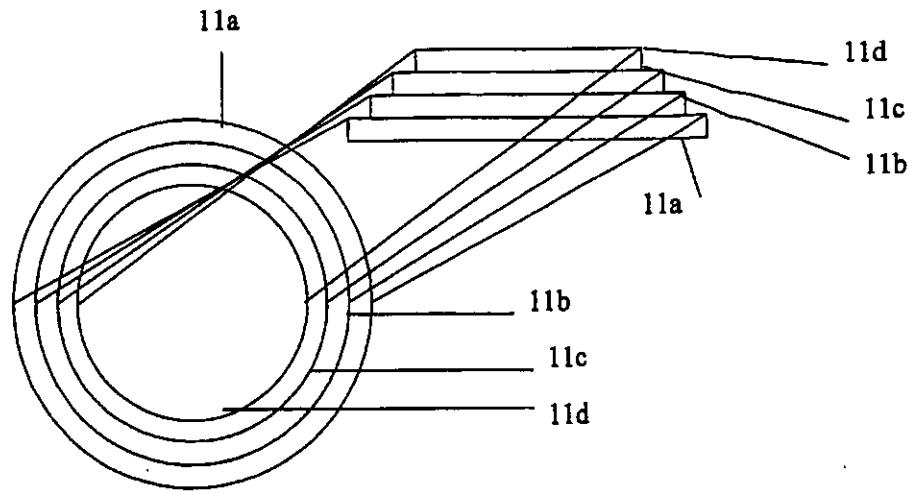


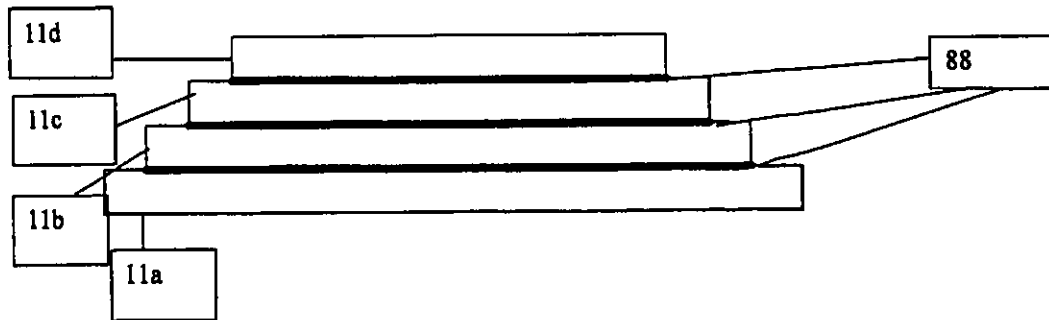
Figure 9a



**Figure 9b**



**Figure 9c**



## A Compound Planetary Gear System in a Geared Wheel Motor

### Technical Field

The present invention relates generally to gearing systems for motors,  
5 particularly to planetary gearing systems for electric motors. The present invention relates to aircraft landing gears, and more specifically to self-powered ground wheels of aircraft. The present invention also relates to systems for pre-rotating the landing gear wheel prior to landing.

### Background Art

10 U.S. Patent No. 3,711,043 to Cameron-Johnson discloses an aircraft drive wheel having a fluid-pressure-operated motor housed within the wheel and two planetary gear stages housed in a gear box outboard of the motor, the final drive being transmitted from a ring gear of the second gear stage, which is inboard of the first stage, to the wheel through an output drive quill  
15 coupled, through a disc-type clutch if desired, to a flanged final drive member bolted to the wheel.

U.S. Patent No. 3,977,631 to Jenny discloses a wheel drive motor selectively coupled to an aircraft wheel through a rotatably mounted aircraft brake assembly in order to drive the wheels of an aircraft. The normally  
20 nonrotating stator portion of a conventional aircraft brake assembly is rotatably mounted about the wheel axle and is rotatably driven through a planetary gear system by the wheel drive motor.

U.S. Patent No. 5,104,063 to Hartley reviews the prior art on pre-rotation of landing wheels and discloses a device to induce rotation of aircraft landing  
25 wheels, using only the force of oncoming air to bring them up to synchronous ground (landing) speed during approach to landing. The wheel has an impeller attached to it, and the wheel is rotated by air from a duct having a forward air intake and an air outlet.

30 The use of small compact electric motors inside, or in close proximity to, a wheel for direct drive has a number of problems. For example, to move a medium sized aircraft at about 7 knots (3.6 m/s), approximately 200hp (150 kW) is required, which equates to approximately 14200 newton-meters of torque and a tractive effort of 41400 newtons, or 9300 pounds.

35 For such a requirement, torque versus speed characteristics of the load, and the maximum speed characteristics of the load when driven, fall well outside the ideal predicted by motor scaling laws. This means that a motor sized to

produce the torque necessary for direct drive of the load will be operating at well below maximum speed, and thus well below maximum power levels. The active materials of the machine will be underutilized, the machine will be far heavier than necessary, and the machine efficiency will be poor.

- 5 A solution is to provide for a higher speed, lower torque motor coupled to the load via suitable gearing. This gearing trades speed for torque and provides a lower speed, higher torque drive to the final load. The load however, is expected to operate at much higher than normal motoring speeds. This presents a significant problem, because, in these cases, the load may be
- 10 rotating faster than the motor and may accelerate the motor via the gearing system. Under these conditions, the motor would be forced to spin at much higher speeds than normal.

### Disclosure of Invention

- 15 From the foregoing, it may be appreciated that a need has arisen for a small compact gearing system which may be located in or near a drive wheel, and which allows a drive motor to provide the necessary torque with reasonable system mass. Additionally, a mechanism that allows the high gear ratio to automatically de-couple the motor from the load if the load overhauls the motor is required.

- 20 The present invention is a compound planetary gear system having one or more pairs of planetary gears of differing diameters, one smaller and one larger, each pair having a common axis and fixedly connected together and rotatable only as a single unit. The planetary gears are fixed to a planetary gear carrier. The system also includes a pair of coaxial sun gears consisting of a
- 25 lockable sun gear (LSG) and a moveable sun gear (MSG). These also have differing diameters, one smaller and one larger, independently rotatable axes, and are coaxial with the planetary gear carrier. The larger planetary gear meshes with the smaller sun gear, and the smaller planetary gear meshes with the larger sun gear. The sum of the radii of the smaller planetary gear and the larger sun gear is equal to the sum of the radii of the larger
- 30 planetary gear and the smaller sun gear. The two sun gears are interlocked by a magnetic interlock, which causes the sun gears to rotate in synchrony, provided that the differential torque between the sun gears is weaker than the magnetic interlock. The system also includes a locking mechanism which
- 35 locks LSG to its axis. Change between gear ratios is achieved by locking or unlocking a sun gear. When LSG is locked to its axis the differential torque between LSG and MSG is greater than the magnetic interlock and MSG rotates at the rotation rate of the planetary gear carrier multiplied by a gear ratio.

When LSG is not locked to its axis the differential torque between LSG and MSG is less than the magnetic interlock and the two sun gears rotate at the rotation rate of the planetary gear carrier. The locking mechanism may be a ratchet which provides for automatic gear reduction in the event of an  
5 'overhauling' load, that is, when the load applies a strong torque through the gear system in the reverse direction. The present invention is a co-axial wheel drive motor using a lockable planetary gear system to provide the necessary torque with reasonable system mass. In the disclosed system, a compound planetary gear system is used to provide a gear ratio necessary to  
10 drive the load, while at the same time a ratchet mechanism automatically decouples the high gear ratio from the load if the load overhauls.

A further embodiment of the present invention includes the use of gear rings instead of sun gears. A further embodiment of the present invention includes having more than two sun gear and planetary gear components on each axis. In  
15 the present invention, the enhanced capabilities of a mesh-connected polyphase motor system are additionally harnessed to provide the high levels of torque required when moving from stationary or low speed, and for providing low levels of torque at higher speeds.

This means that the same motor can be used for moving an aircraft around a  
20 hangar and for taxiing at an airport, and obviates the need for separate tractor units.

In addition the same motor can be used to pre-rotate the wheels prior to landing to reduce tire wear and for a softer landing, thereby reducing impact stress to undercarriage and other aircraft components.

## 25 Brief Description of Drawings

For a more complete explanation of the present invention and the technical advantages thereof, reference is now made to the following description and the accompanying drawings, in which:

Figure 1 shows a diagrammatic representation of a front view and a side view  
30 of a gear system of the present invention;

Figure 2 shows a diagrammatic representation of a front view of a gear system of the present invention;

Figure 3 shows radii of various gears of one embodiment of the present invention;

5 Figure 4 shows a diagrammatic representation of a cross-section of a drive system of the present invention used in the hub of an aircraft nose wheel;

Figure 5 shows a three dimensional view of one embodiment of the present invention used in an aircraft nose gear.

10 Figures 6A-E illustrate a plurality of ways in which the polyphase inverter may be connected to a polyphase motor.

Figures 7A-D illustrate how winding terminals of a motor connected to a polyphase inverter in a particular fashion may be driven by the inverter with various phase angles.

15 Figure 8 shows a diagrammatic representation of a plan view of a gear system of the present invention employing ring gears in place of sun gears.

Figures 9a-9c show diagrammatic representations of a gear system of the present invention employing multiple gears.

#### Best Mode for Carrying Out the Invention

20 Embodiments of the present invention and their technical advantages may be better understood by referring to Figures 1-7.

Referring now to Figures 1 and 2, which show diagrammatic representations of a gear system of the present invention useable in a variety of settings, three compound planetary gears 21 all share identical features, and are disposed evenly around a sun gear axis 30. The planetary gears 21 are  
25 compound, and consist of two coaxial circular spur gears 21a, and 21b, of different pitch diameter (shown in expanded view in Figure 2). The coaxial circular spur gears 21a, and 21b are fixedly connected together, or formed initially as a single unit, so that they are only able to rotate as a single unit. The number of compound planetary gears (3 shown here) will be  
30 application dependant, with respect to size and torque considerations. For the sake of clarity the gear teeth are not shown. The teeth may be any type of gear teeth known in the art, for example, spur or helical. The planetary gears 21, in operation, are rotated by the planetary carrier 40, around the central sun axis 30, yet they are also free to rotate, each around its own  
35 planetary gear axis 31. A motor 50 may be connected to the planetary gear carrier via conventional gearing or directly. A first sun gear, 11a, is



disposed on sun gear axis 30, and is connected to a load (not shown). Sun gear 11a is disposed on the same plane as the circular spur gear 21a, and meshes with it. A second sun gear, 11b, of different pitch diameter to the first sun gear 11a, shares sun gear axis 30, although the two sun gears are independent of one another. In a preferred embodiment, sun gear 11b has a slightly smaller pitch diameter than that of sun gear 11a. Sun gear 11b is disposed on the same plane as circular spur gear, 21b, which is disposed to mesh with sun gear 11b. The first and second sun gears 11a and 11b have permanent magnet or electromagnet 60 fixed between them, encouraging the two sun gears 11a and 11b to rotate in synchrony. The number and position of such magnets will depend on the particular application. Furthermore, sun gear 11b has locking system 62 allowing sun gear 11b to be selectively locked to a stationary system part, preferably to its own axis. When the sun gear 11b is selectively locked, the magnet represents a negligible force and does not substantially affect the movement of the other sun gear 11a. In a further embodiment, the second sun gear 11b, is attached to ratcheting or free wheel mechanism 62 of conventional construction, which allows sun gear 11b to be driven by the motor input but not be affected retroactively by the speed of the load.

In operation, planetary gear carrier 40 is driven in the direction of arrow 71 by the motor. Compound planetary gears 21 are fixed in position on planetary carrier 40, however they are free to rotate about their own axes 31. When planetary carrier 40 is rotated by the 50 about sun gear axis 30, planetary gears 21 are forced to rotate around sun gear axis 30, in the direction of arrow 71. Planetary gears 21 are also forced to rotate about their own axes, 31, by rolling without slipping on sun gears 11. The direction in which the planetary gears will rotate about their own axes 31, given the specific pitch diameters above, will be in the direction of arrow 72. Because of the difference in gear ratio between the compound planetary gears and the sun gears, the two sun gears are forced to rotate at different speeds. There are two possible conditions, depending upon the locking state of the lockable sun gear.

The gear system of the present invention has two operating states. In the first operating state, lockable sun gear (LSG) 11b is unlocked. Motor 50 turns compound planetary gear carrier 40, which rotates compound planetary gears 21 about sun axis 30 at motor speed. Compound planet gears 21 are meshed with sun gears 11. Magnetic linkage between the sun gears, provided by magnets 60, causes the sun gears to rotate at the same rate. This linkage also prevents the planetary gears from rotating about their axes 31. This

means that the planetary gears are disposed in a fixed position on the sun gears. In this operating state, planet carrier 40, compound planet gears 21, and sun gears 11 all rotate at the same rate. Motor 50 thus drive the load with a 1:1 gear ratio. Of course, the 1:1 gear ratio is not necessarily exact, as load forces may cause the magnetic linkage between sun gears 11a and 11b to slip. However, absent other forces, the gears will tend to rotate according to the path of least resistance, with all gears moving as a single unit.

In the second operating state, lockable sun gear 11b is locked to a stationary shaft. LSG 11b may be locked using a ratcheting system, which permits free rotation in one direction, or it may be locked with a suitable fixed mechanism. Motor 50 drives planet carrier 40. Planet carrier 40 drives planet gears 21 about sun axis 30. Planet gears 21b mesh with LSG 11b. Because LSG 11b is stationary, planet gears 21b are forced to rotate about axis 31 as they roll along LSG 11b. The rotation of planet gears 21b will have the same sense as planet carrier 40. The number of rotations of planet gears 11b per rotation of planet carrier 40 will be set by the ratio of pitch diameter between LSG 11b and planet gears 21b. As compound planet gears 21 rotate, planet gear 21a will roll on moveable sun gear (MSG) 11a. Because the pitch diameters of planet gears 21a and MSG 11a are different from those of planet gears 21b and LSG 11b, MSG 11a will be forced to move relative to LSG 11b. Compound planet gears 21 will transmit torque between LSG 11b and MSG 11a and planet carrier 40.

The gear ratio between the planet carrier input and the MSG 11a output, is dependent on the pitch diameter of the sun and planet gears, and may be determined by the following formula:

$$1/(1 - (PPa/PPb) \times (PSb/PSa))$$

in which  $PSa$  is the pitch diameter of moveable sun gear 11a,  $PSb$  is the pitch diameter of lockable sun gear 11b,  $PPa$  is the pitch diameter of the planet gear circular spur component 21a, and  $PPb$  is the pitch diameter of the planet gear circular spur component 21b.

The pitch diameter of the planetary gear components gears 21a and 21b and the distance of the planetary gear axis 31 from the sun gear axis 30 are calculated to enable proper meshing between each sun gear and its co-planar component circular spur gears of planetary gears 21. Sample comparative measurements are shown in Figure 3. Here  $PPb = 1.6$ ;  $PPa = 1.5$ ;  $PSb = 3.9$ ;  $PSa = 4.0$ , and therefore the gear ratio is:

$$1/(1 - (1.5/1.6) \times (3.9/4.0))$$

$$= 11.64$$

To further define and disclose the present invention, an embodiment with specific gear pitch diameters and tooth counts is provided. The specific number of teeth should be seen as exemplary and not as limiting the scope of the invention. The actual number of teeth, number of compound planetary gears, etc. will be determined by the specific application. In general, the sun gears 11a and 11b will be considerably larger than planetary gears 21. For example, moving sun gear 11a may have 61 teeth. Lockable sun gear 11b has 60 teeth. Compound planetary gear 21 is composed of component 21a with 20 teeth, and component 21b with 21 teeth. Sun gears 11a and 11b are selected to have slightly different tooth counts, and thus slightly different pitch diameters. Compound planetary gear components 21a and 21b are selected to properly mesh with sun gears 11a and 11b.

15 If the locked sun gear 11b has 60 teeth, and planet gear 21b has 20 teeth, when the planet carrier rotates once, the compound planet gears have moved all the way around the sun gear once, and must have rotated 3 times, because of the gear ratio between 11b and 21b. For a moveable sun gear 11a having 61 teeth, then its diameter has increased by 1 tooth pitch divided by  $\pi$ , and thus planet gear 21a must have 19 teeth, since its diameter will need to decrease by 1 tooth pitch divided by  $\pi$  to keep the axis positions the same. Since the planet gears are compound gears, then both halves of the planet gears will turn at the same time. Thus when the planet carrier makes one revolution about the fixed sun gear, the planet gears will make 3 revolutions. Now, the 19 teeth of 21a making 3 revolutions around the 61 teeth of 11a means that the second half of the planet gears will have rolled only 57/61 of the way around the second (moveable) sun gear. Since the planet gears have moved all the way around the fixed sun gear, and 57/61 of the way around the second sun gear, the two sun gears must move relative to each other. For each input revolution of the planet carrier, the second sun gear will move 4/61 of a revolution, for a gear ratio of approximately 15:1.

This non-slipping, high gear ratio means that input speed is reduced at the output, and input torque is increased at the output. This permits motor 50 to drive the load with high torque although at low speed. The increased output torque is provided by the reaction torque on the locking mechanism of LSG 11b

To further illustrate the application of the present invention, reference is made to Figure 4, which shows the gearing system of the invention arranged to drive the nose wheel of an aircraft. Electric motor 50 is supported on strut

34 of an aircraft nose wheel. The motor comprises a stator 502 and a rotor 504, and in the embodiment shown in Figure 4, the motor is an inside-out motor having the stator attached to the strut, and having the rotor attached to gear system 506. The gear system comprises a planetary gear carrier 40, 5 compound planetary gears 21a and 21b, and sun gears 11a and 11b. The motor drives the planetary gear carrier, and sun gear 11a rotates around the strut and drives the wheel. Sun gear 11a is referred to in the following as the Moveable Sun Gear (MSG). In this preferred embodiment, the motor and gears are located within a nose wheel of an aircraft. A locking mechanism 62 is 10 provided for locking sun gear 11b to the strut, thereby preventing sun gear 11b from rotating during low speed, high torque operation. Sun gear 11b is referred to in the following as the Lockable Sun Gear (LSG). During low torque, high speed, direct drive operation, the locking mechanism is 15 disengaged and magnets 60 on the two sun gears cause the two sun gears to rotate together at substantially the same speed as the motor drive, thereby providing direct drive from the motor to the wheel.

Referring now to Figure 5, which shows a three dimensional view of one embodiment of the present invention used within a nose wheel of an aircraft, motor 50 is located behind planetary carrier 40 (shown in cutout section 83). 20 Whilst this is a preferred location for the motor, it is to be understood that the illustrated motor/planetary carrier position is not intended to limit the scope of the invention, and the motor may be alternatively situated elsewhere. For example, the motor may be located within the fuselage of the aircraft, and drive may be provided to the planetary carrier via a gear train 25 or belt system. Planetary carrier 40 is driven by the motor and rotates compound planetary gears 21, around sun gear axis 30. The number of planetary gears (3 shown here) will be application dependent, with respect to size and torque considerations. The compound planetary gears are shown in this embodiment to have a slanting toothed surface enabling proper meshing with 30 the sun gears 11a and 11b. For the sake of clarity the gear teeth are not shown. The teeth may be any type of gear teeth known in the art, for example, spur or helical. Planetary gear component 21a rotate sun gear 11a; sun gear 11a directly drives the wheel. The sun gear axis 30 may be centered on axle 33 of the nose wheel.

35 As disclosed above, motor 50 itself may be an 'inside-out' radial flux induction motor 50. The stator may be on the inside of the motor, mounted to the same hollow shaft which usually supports the conventional (non-driven) wheels. All of the necessary electrical conductors will be fed through the hollow shaft, and will not interfere with the various system bearings

involved. Viewed externally, the stator will look much like a conventional wound rotor build using conventional lamination materials and copper conductors. Rectangular conductors and formed coils may be used, rather than random wound coils. This provides for better cooling of the copper

5 conductors, greater stability to vibration and G forces, as well as better slot fill and more efficient use of the magnetic iron. The rotor may be mounted on end bells and bearings, again on the same hollow shaft. Planet gear carrier 40 may be directly coupled to the rotor.

In an exemplary embodiment, the outer diameter of the rotor is approximately

10 10-15 inches (25-38 cm), and the total length of the motor 50 including end bells is between 7 and 9 inches (18-23 cm). The gearing system occupies the space within a wheel hub half. The 'foot' of one half of the wheel hub (that portion of the wheel hub at the center which is supported by the bearing, which in profile appears as a foot) may be used as the mobile sun gear

15 described above. In order to carry the necessary tooth forces, the width of the foot may need to be increased. The stationary sun gear described above is roughly the same size as the hub foot, and is mounted on a bearing adjacent to the hub foot. The radial forces on the stationary sun gear are much lower than those on the hub, and space for this bearing is shared with

20 the pawl mechanism. The motor is then adjacent to the stationary sun gear, and the planet gear carrier is mounted on the motor 50 such that the planet gears are held in proper radial contact with the sun gears. Using a pitch diameter of 8" (20.3 cm) for the rotating sun gear, 7.8" (19.8 cm) for the stationary sun gear, 3" (7.6 cm) for the rotating side planet gear and 3.2"

25 (8.1 cm) for the stationary side planet gear, an overall system diameter < 15" (38 cm) may be maintained, with a gear ratio of about 11.5:1.

During high speed operation where the driven wheel may act to 'back drive' motor 50, torques on the gear system are reversed. In the ideal case, the pawl system is retracted, and the motor 50 simply spins at the same speed as the wheel. In the event that the speed of the system is too high, the pawl mechanism used to hold the stationary sun gear in place is designed to

30 ratchet, acting in a failsafe manner to protect the motor 50 from over-speed operation.

The ratchet mechanism locks LSG 11b only when torque applied to LSG 11b is in the proper direction for motor 50 to drive the load forward. In contrast,

35 should the load attempt to drive motor 50, which might result in a dangerous overspeed condition, the torque applied to LSG 11b will reverse, and the ratchet mechanism will release. In this case, the gear ratio will revert to the slipping 1:1 gear ratio.

It is desirable to use the 1:1 gear ratio when the load is moving rapidly. In the case of aircraft wheels, the slipping 1:1 gear ratio might be used to 'prespin' wheels prior to landing. In addition, the non-slipping high gear ratio presents a danger. In the event of a forceful overhauling load, say  
5 for example the inertial forces on an aircraft wheel at touchdown, the 1:1 gear ratio is desirable to protect motor 50 from over-speed. It is desirable in this case for an automatic transition between the high gear ratio and the slipping 1:1 gear ratio.

A further embodiment of the invention is a system for prerotating an  
10 aircraft's landing gear wheel prior to landing. The aircraft has at least one landing gear wheel attached to the aircraft by a support. The system has conventional sensors for measuring the true ground speed of the aircraft independently from the aircraft's airspeed. It also has the compound planetary gear system as described above and a motor which rotates the wheel  
15 at a selected speed while the aircraft is airborne. This is controlled by a system that measures the rotational speeds of the wheel, and is responsive to the true ground speed and to the speed of the wheel. This ensures that the rotational speed of the wheel correspond to the true ground speed of the aircraft. For this embodiment the said locking mechanism is not selected and  
20 the compound planetary gear system provides a slippery 1:1 ratio.

Motor 50 may be any suitable motor, including an electric motor or an hydraulic motor. Preferably, the motor is an electric motor, and in a preferred embodiment, it is a high-phase order mesh-connected motor of the kind described in WO0235689. Referring now to Figure 6a, which shows a simple  
25 graphical schematic of the permissible inverter to motor windings connections for a polyphase motor having 9 phases, 9 evenly spaced terminals 4 and a center terminal 6 are shown. Each of the terminals 4 represent one end of a motor winding 1 and the center terminal 6 represents the other end of the motor winding. An inverter 5 has 9 terminals 2, which are connected to one  
30 of the terminals 4 of each of the motor windings 1 via electrical connectors 3 as shown. In this embodiment, the number of phases, N is equal to 9, but it is to be understood that this limitation is made to better illustrate the invention; other values for N are also considered to be within the scope of the present invention.

35 Permissible connections of the 9 phase windings are either from the center point, to each of the 9 points on the circle (this being the star connection shown as Figure 6a) or from each of the 9 points to another point S skipped points distant in the clockwise direction, where S represents the number of skipped points (inverter terminals). This latter is shown in Figures 6b-e;

in Figure 6b motor winding 1 is represented by a line, and in Figures 6c-e inverter 5 and electrical connectors 3 have been omitted for the sake of clarity. It will be noted that for each S from 0 to 3 there is a corresponding S from 4 to 7 that produces a mirror image connection.

5 Figure 6 shows all permissible connections for a 9 phase system from S=0 to S=3 as well as the star connection. Noted on the star connection diagram (Figure 6a) are the relative phase angles of the inverter phases driving each terminal. For a given inverter output voltage, measured between an output terminal 2 and the neutral point, 6 each of these possible connections will  
10 place a different voltage on the connected windings. For the star connection, the voltage across the connected windings is exactly equal to the inverter output voltage. However, for each of the other connections (Figures 2b-e), the voltage across a winding is given by the vector difference in voltage of the two inverter output terminals 2 to which the winding 1 is  
15 connected. When this phase difference is large, then the voltage across the winding will be large, and when this phase difference is small, then the voltage across the winding will be small. It should be noted that the inverter output voltage stays exactly the same in all these cases, just that the voltage difference across a given winding will change with different  
20 connection spans. The equation for the voltage across a winding is given by:

$$2\sin\left(\frac{\Delta}{2}\right)V_{out}$$

where  $\Delta$  is the phase angle difference of the inverter output terminals driving the winding, and  $V_{out}$  is the output to neutral voltage of the inverter.

25 Thus, referring to Figure 6, when S=0 (Figure 6b), the phase angle difference is 40 degrees, and the voltage across a winding is 0.684Vout. When S=1 (Figure 6c), the phase angle difference is 80 degrees, and the voltage across the winding is 1.29Vout. When S=2 (Figure 6d), the phase angle difference is 120 degrees, and the voltage across the winding is 1.73Vout. Finally, when  
30 S=3 (Figure 6e), the phase angle difference is 160 degrees, and the voltage across the winding is 1.97Vout. For the same inverter output voltage, different connections place different voltage across the windings, and will cause different currents to flow in the windings. The different mesh connections cause the motor to present a different impedance to the  
35 inverter. In other words, the different mesh connections allow the motor to use the power supplied by the inverter in different ratios of voltage and

current, some ratios being beneficial to maximize the torque output (at the expense of available speed), and some ratios to maximize the speed output (at the expense of maximum available torque).

To deliver the same power to the motor, the same voltage would have to be placed across the windings, and the same current would flow through the windings. However, for the S=0 connection, to place the same voltage across the windings, the inverter output voltage would need to be much greater than with the S=3 connection. If the inverter is operating with a higher output voltage, then to deliver the same output power it will also operate at a lower output current. This means that the S=0 connection is a relatively higher voltage and lower current connection, whereas the S=3 connection is a relatively lower voltage, higher current connection.

The S=0 connection is desirable for low speed operation, where it increases the overload capabilities of the drive, and permits much higher current to flow in the motor windings than flow out of the inverter terminals. The S=3 connection is desirable for high speed operation, and permits a much higher voltage to be placed across the windings than the inverter phase to neutral voltage. This change in connection is quite analogous to the change between star and delta connection for a three-phase machine, and may be accomplished with a mechanical switching arrangement, such as that disclosed in my patent application US2003/0075998.

There is, however, an additional approach available with high phase order inverter driven systems.

The inverter, in addition to being an arbitrary voltage and current source, is also a source of arbitrary phase AC power, and this output phase is electronically adjustable. Any periodic waveform, including an alternating current may be described in terms of amplitude, frequency, and phase; phase is a measure of the displacement in time of a waveform. In a polyphase inverter system, phase is measured as a relative phase displacement between the various outputs, and between any pair of inverter terminals, an electrical phase angle may be determined. In the case of conventional three phase systems, this electrical phase angle is fixed at 120 degrees. However in polyphase systems this phase angle is not fixed. Thus, while the machine terminals 1..9 may be fixed in their connection to inverter terminals 1..9, the phase relation of the inverter terminals connected to any given motor winding terminals is not fixed. By changing the inverter phase relation, the impedance that the motor presents to the inverter may be changed. This may be done without contactors.



With Reference to Figure 7, a 9 phase machine is connected to the inverter system using the  $S=3$  mesh. One terminal of each of two windings 1 is connected to each inverter terminal 2. When driven with 'first order' phase differences, then the results are as described above for the  $S=3$  mesh.

5 However, if the phase angles are adjusted by multiplying each absolute phase reference by a factor of three, then the phase differences placed across each winding become the same as those found in the  $S=2$  case, although the topological connectivity is different. If the phase angles are adjusted by a multiplicative factor of five, then the voltages across windings become like  
10 those of the  $S=1$  case, and with a multiplicative factor of seven, the voltages become like those of the  $S=0$  case. A multiplicative factor of nine causes all phases to have the same phase angle, and places no voltage difference across the winding.

These changes in phase angle are precisely the changes in phase angle used to  
15 change the operating pole count of a high phase order induction machine, as described in others of my patent applications and issued patents.

If a high phase count concentrated winding induction machine is operated by an inverter, but is connected using a mesh connection, then changes in pole count of the machine will be associated with changes in machine effective  
20 connectivity. These changes in effective connectivity permit high current overload operation at low speed, while maintaining high-speed capability, without the need for contactors or actual machine connection changes.

Of particular value are machines connected such that the fundamental, or lowest pole count, operation is associated with a relative phase angle across  
25 any given winding of nearly, but not exactly, 120 degrees. In these cases, altering the output of the inverter by changing the absolute phase angles by a multiplicative factor of three, which may also be described as operation with the third harmonic will result in the relative phase angle across any given winding becoming very small, and causing large winding currents to flow  
30 with low inverter currents. A particular example would be a 34 slot, 17 phase machine, wound with full span, concentrated windings, to produce a two pole rotating field. The winding terminations are connected to the inverter using the  $S=5$  mesh. The relative phase angle of the inverter outputs placed across any given winding would be 127 degrees, and the voltage placed across  
35 this winding relative to the inverter output voltage is 1.79 times the inverter output voltage. If the machine is then operated with a third harmonic waveform, it will operate as a six pole machine. The relative phase angle across any given winding is now  $127 \times 3 \bmod 360 = 21$  degrees, and the voltage placed across the winding relative to the inverter output voltage is

0.37 times the inverter output voltage. Simply by changing the inverter drive angles, the Volts/Hertz relationship of the motor is increased, and inverter limited overload capability is enhanced.

The 'switching' between modes of operation in this mesh-connected  
5 motor/inverter combination are achieved by altering the harmonic content of the output from the inverter, effectively changing the volts/hertz relation of the motor, thereby producing a variable impedance motor.

While this invention has been described with reference to numerous  
embodiments, it is to be understood that this description is not intended to  
10 be construed in a limiting sense. Various modifications and combinations of the illustrative embodiments will be apparent to persons skilled in the art upon reference to this description. It is to be further understood, therefore, that numerous changes in the details of the embodiments of the present invention and additional embodiments of the present invention will be  
15 apparent to, and may be made by, persons of ordinary skill in the art having reference to this description. It is contemplated that all such changes and additional embodiments are within the spirit and true scope of the invention as claimed below.

For example, in another embodiment, a reverse gear is optionally available  
20 between the MSG 11a output and the load. The effect of this gear, when in operation is to reverse the direction of the load rotation, relative to the direction of the planet carrier 40 rotation. With the ratchet system described, changing the direction of motor 50 rotation, or of planet carrier rotation, will only be effective in allowing the load to turn in reverse with  
25 a 1:1 gear ratio. However, a reverse gear (which may be simple or complex, as is well known in the art), when used between the MSG and the load, will act to change the direction of load rotation, in a way that the ratchet system will allow operation with a high torque, low speed gear ratio.

In a further embodiment, shown in Figure 8, the sun gears are replaced by  
30 ring gears 41a and 41b, whilst planet gear components 21a and 21b are rotated by planet carrier 40 within ring gears 41a and 41b. The invention works in the same manner as described with relation to sun gears 11a and 11b, and a ratchet and/or a locking mechanism may act on the ring gears from an external surface of the lockable ring gear 41b, or against a side of lockable ring  
35 gear 41b.

The invention is not limited to two different gear ratios. The compound gear 21 may be composed of additional spur components, 21c, 21d etc. There would also be additional lockable sun gears, 11c, 11d etc., meshing with the

additional planet gear spur components, as shown in Figure 9a. Figure 9b shows a plan view and a side view of the pile of sun gears 11a-11d. Each additional lockable sun gear would be separately lockable and have an attached magnet 60 to attach it directly or indirectly to moveable sun gear 11a so that when lockable sun gears 11c, and/or 11d are released, they can still only rotate more or less in lockstep with moveable sun gear 11a. In one embodiment, moveable sun gear 11a has the greatest pitch diameter of the sun gears, whilst LSG 11b has the next largest, etc. The sun gears are mounted in alphabetical order, beginning with MSG 11a, and then LSGs 11b, 11c and 11d (if used). A separate magnet 60 is placed between each sun gear and the adjoining sun gear, as shown in Figure 9c. By selectively locking one or more of the lockable sun gears 11a, 11b and 11c, one can vary between three different gear ratios.

It is further possible to replace the ratchet mechanism with a different ratchet mechanism acting between the moveable sun gear and the load. This ratchet may be identical to, or a variation of, the ratchet often used between the pedals and the back wheel of many bicycles, and will allow the motor to rotate the load whilst preventing the torque from the load from having an effect on motor.

In a further embodiment, the stationary sun gear is held stationary throughout operation, no ratchet system is employed, and only the second operating state is used.

The present invention is described using spur components, however this is for simplicity's sake, and helical components would be an equally suitable alternative.

### Industrial Applicability

The present invention may be applied in any application where a small compact and co-axial gearing system is required, specifically to provide direct drive at high speed, or a reduced speed drive having higher torque.



## Claims

1. A compound planetary gear system, comprising:
  - a. one or more pairs of planetary gears of differing diameters, each pair comprising a larger planetary gear and a smaller planetary gear, each pair having a common axis and fixedly connected together and rotatable only as a single unit, said common axis attached to:
  - b. a planetary gear carrier;
  - c. a pair of coaxial sun gears consisting of a lockable sun gear (LSG) and a moveable sun gear (MSG), wherein said sun gears have differing diameters comprising a larger sun gear and a smaller sun gear, independent axes, and are coaxial with said planetary gear carrier; and wherein the larger planetary gear meshes with the smaller sun gear, the smaller planetary gear meshes with the larger sun gear, and the sum of the radii of the smaller planetary gear and the larger sun gear is equal to the sum of the radii of the larger planetary gear and the smaller sun gear, and wherein said sun gears are interlocked by:
  - d. a magnetic interlock, which causes said sun gears to rotate in synchrony, provided that a differential torque between said sun gears is weaker than said magnetic interlock;
  - e. a locking mechanism which locks LSG to its axis, wherein when LSG is locked to its axis said differential torque between LSG and MSG is greater than said magnetic interlock and MSG rotates at the rotation rate of said planetary gear carrier multiplied by a gear ratio; and wherein when LSG is not locked to its axis said differential torque between LSG and MSG is less than said magnetic interlock and the two sun gears rotate at the rotation rate of said planetary gear carrier.
2. The compound planetary gear system of claim 1 wherein said gear ratio is  $1/(1 - (PPa/PPb) \times (PSb/PSa))$ , wherein  $PSa$  is a pitch diameter of said MSG,  $PSb$  is the pitch diameter said LSG,  $PPa$  is the pitch diameter of a planet gear that meshes with said MSG, and  $PPb$  is the pitch diameter of a planet gear that meshes with said LSG.
3. The compound planetary gear system of claim 1 additionally comprising:
  - g. an input means connected to said planetary gear carrier; and
  - h. an output means connected to said MSG.

4. The compound planetary gear system of claim 3 wherein said input means is connected to a motor.
5. The compound planetary gear system of claim 4 wherein said motor is selected from the group consisting of electric motor, radial flux  
5 induction motor, and hydraulic motor.
6. The compound planetary gear system of claim 5 wherein said electric motor is a high phase order induction machine drive system, comprising:
  - a) an inverter system for the synthesis of a plurality of phases of alternating current output, each phase electrically connected to at  
10 least one inverter terminal, and
  - b) an induction motor comprising N phases, where N is greater than 3, connected mesh to said inverter terminals, said mesh characterized in that:  
each motor phase is electrically connected to:  
15 (i) a first inverter terminal, and  
(ii) a second inverter terminal S skipped terminals distant from said first inverter terminal in order of electrical phase angle, where S is the skip number and represents the number of skipped terminals;  
and the phase angle difference between the two inverter terminals to  
20 which each motor phase is connected is identical for each motor phase.
7. The compound planetary gear system of claim 3 wherein said input means is connected to a load.
8. The compound planetary gear system of claim 7 wherein said load is an aircraft wheel.
- 25 9. The compound planetary gear system of claim 1 wherein said locking mechanism additionally comprises a ratcheting mechanism.
10. The compound planetary gear system of claim 4 wherein said locking mechanism additionally comprises a ratcheting mechanism and wherein said ratcheting mechanism releases said LSG when said planetary gear carrier  
30 rotates faster than said motor.
11. The compound planetary gear system of claim 1 wherein said locking mechanism is selectable by an operator, wherein when said locking mechanism is not selected said compound planetary gear system provides a  
35 slippery 1:1 ratio, and wherein when said locking system is selected said compound planetary gear system provides a reduction ratio.
12. The compound planetary gear system of claim 1 wherein said gears are selected from the group consisting of: spur gears and helical gears.

13. The compound planetary gear system of claim 2 additionally comprising:
  - i. a reverse gear unit disposed between MSG and said output means.
14. An aircraft ground wheel comprising a wheel mounted on an undercarriage axle, a motor, and the compound planetary gear system of claim 1,  
5 wherein said motor drives said input, and said output drives said ground wheel.
15. The aircraft ground wheel of claim 14 wherein said motor is located inside said nose wheel.
16. The aircraft ground wheel of claim 14 wherein said motor is located  
10 inside a fuselage of said aircraft.
17. The aircraft ground wheel of claim 16 wherein drive from said motor to said compound planetary gear system is provided by gearing.
18. The aircraft ground wheel of claim 17 wherein said gearing comprises belts.
- 15 19. A system for prerotating an aircraft's landing gear wheel prior to landing wherein the aircraft has at least one landing gear wheel attached to the aircraft by a support, comprising: means for measuring the true ground speed of the aircraft independently from the aircraft's  
20 airspeed; means for rotating said wheel at selective rotational speeds while the aircraft is airborne comprising the compound planetary gear system of claim 1 and a motor; means for measuring said rotational speeds of said wheel; and control means for operating said means for rotating said wheel, said control means being responsive to said means for measuring the true ground speed and responsive to said means for  
25 measuring said rotational speeds of said wheel, wherein said control means operates said means for rotating to selectively increased and decreased rotational speeds of said wheel to correspond to the true ground speed, and wherein when said locking mechanism is not selected and said compound planetary gear system provides a slippery 1:1 ratio.
- 30 20. A compound planetary gear system, comprising:
  - a. one or more pairs of planetary gears of differing diameters, each pair comprising a larger planetary gear and a smaller planetary gear, each pair having a common axis and fixedly connected together and rotatable only as a single unit, said common axis attached to:
  - 35 b. a planetary gear carrier;
  - c. a pair of coaxial ring gears consisting of a lockable ring gear (LRG) and a moveable ring gear (MRG), wherein said ring gears have differing diameters comprising a larger ring gear and a smaller

ring gear, independent axes, and are coaxial with said planetary gear carrier; and wherein the larger planetary gear meshes with the smaller ring gear, the smaller planetary gear meshes with the larger ring gear, and the sum of the radii of the smaller planetary gear and the larger ring gear is equal to the sum of the radii of the larger planetary gear and the smaller ring gear, and wherein said ring gears are interlocked by:

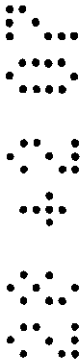
- d. a magnetic interlock, which causes said ring gears to rotate in synchrony, provided that a differential torque between said ring gears is weaker than said magnetic interlock;
- e. a locking mechanism which locks LRG to its axis, wherein when LRG is locked to its axis said differential torque between LRG and MRG is greater than said magnetic interlock and MRG rotates at the rotation rate of said planetary gear carrier multiplied by a gear ratio; and wherein when LRG is not locked to its axis said differential torque between LRG and MRG is less than said magnetic interlock and the two ring gears rotate at the rotation rate of said planetary gear carrier.

21. A compound planetary gear system, comprising:

- a. one or more sets of planetary gears of differing diameters, each pair comprising a larger planetary gear and a smaller planetary gear, each set having a common axis and fixedly connected together and rotatable only as a single unit, said common axis attached to:
  - b. a planetary gear carrier;
  - c. a set of coaxial sun gears comprising a lockable sun gear (LSG) and a moveable sun gear (MSG), wherein said sun gears have differing diameters comprising a larger sun gear and a smaller sun gear, independent axes, and are coaxial with said planetary gear carrier; and wherein the larger planetary gear meshes with the smaller sun gear, the smaller planetary gear meshes with the larger sun gear, and the sum of the radii of the smaller planetary gear and the larger sun gear is equal to the sum of the radii of the larger planetary gear and the smaller sun gear, and wherein said sun gears are interlocked by:
    - d. a magnetic interlock, which causes said sun gears to rotate in synchrony, provided that a differential torque between said sun gears is weaker than said magnetic interlock;
    - e. a locking mechanism which locks LSG to its axis, wherein when LSG is locked to its axis said differential torque between LSG and MSG

is greater than said magnetic interlock and MSG rotates at the rotation rate of said planetary gear carrier multiplied by a gear ratio; and wherein when LSG is not locked to its axis said differential torque between LSG and MSG is less than said magnetic interlock and the two sun gears rotate at the rotation rate of said planetary gear carrier.

5





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2007 JUN 30 A 9:43  
ENGINEERING  
CORPORATE RESEARCH

# New Technology for Moving Airplanes on the Ground

SAE A-5 Toronto

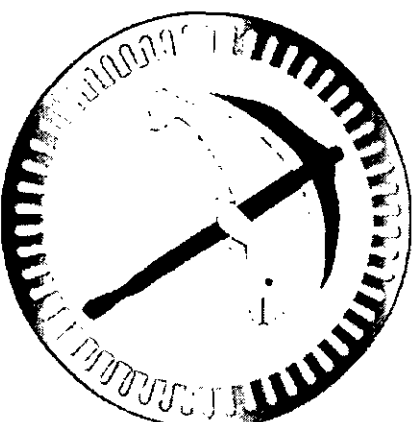
Towbarless Towing Panel

May 2, 07

Gary Ataman

# SAE Presentation

2 May 2007



**WheelTug plc**

# Who?

- WheelTug Plc is a member of the Borealis family of companies.
  - Borealis Exploration Limited, the parent company, was incorporated in 1968.
    - Chorus Motors was incorporated in 1999.
    - WheelTug plc was incorporated in 2005
  - Borealis has had current management since 1978.

# Proposition

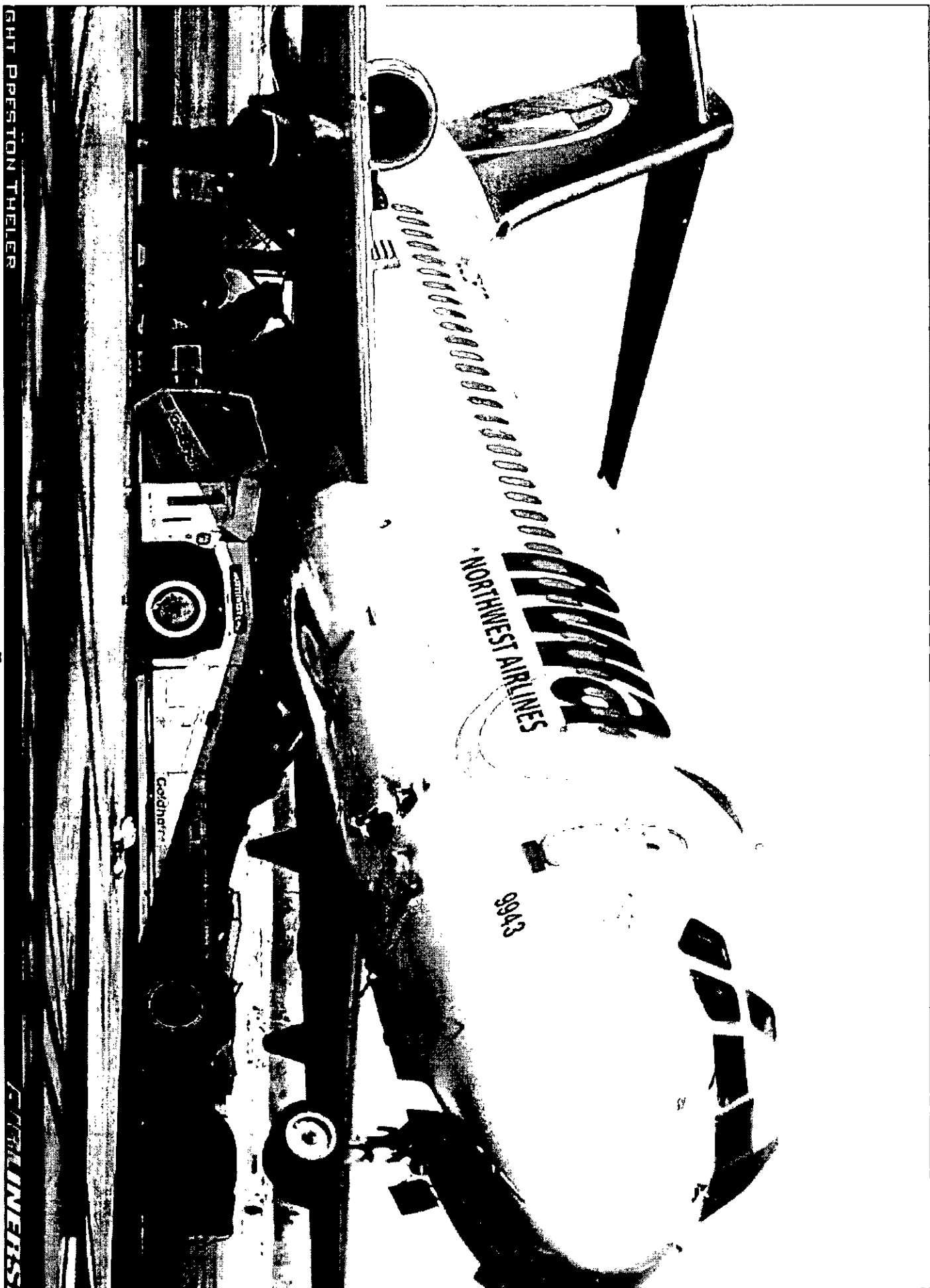
There is a problem  
with efficiency of ground  
operations at airports

The solution to this problem  
contains neat engineering, a  
superb business case, and a  
whole lot of fun!

# WheelTug Benefits

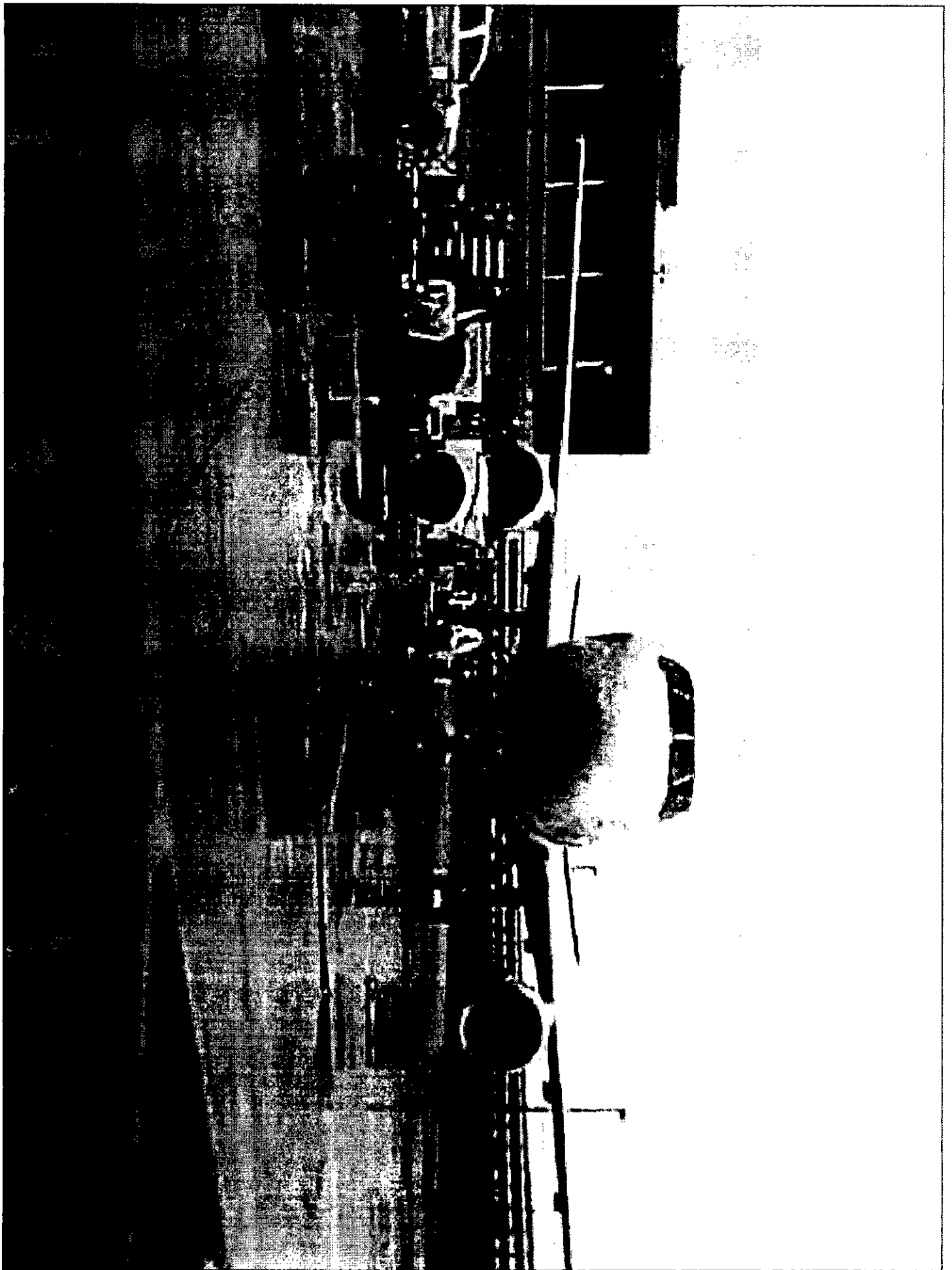
## Safety

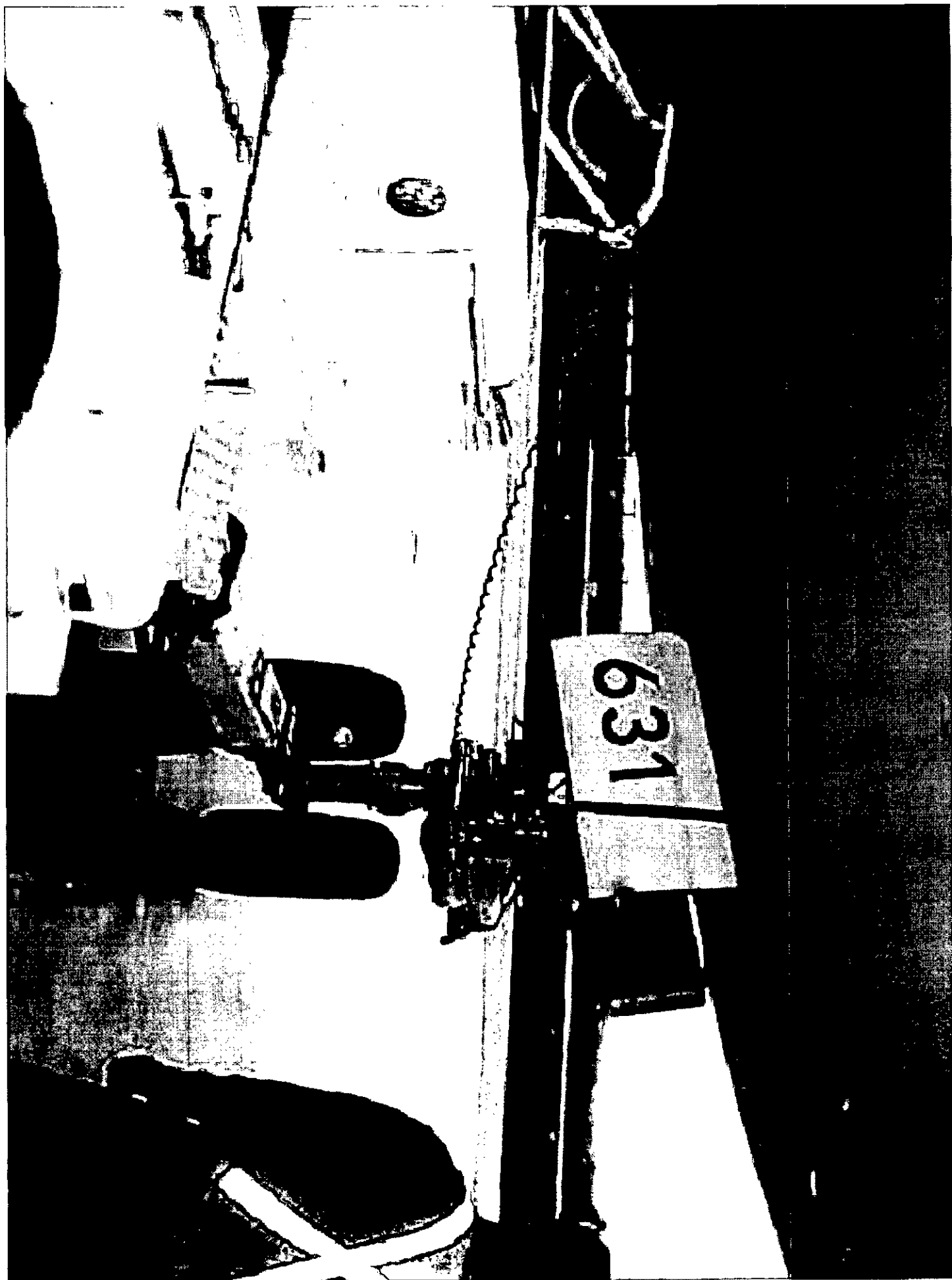
- The use of main engines in gate areas poses a safety hazard because of their:
  - Power
  - Required safety zone
  - Noise
  - Difficulties in control
- Tugs present challenges because:
  - They are another ground vehicle
  - They create communications issues
- WheelTug is silent, reacts immediately and can be cooperatively controlled by the ground and flight crews



GHT PRESTON THELER

GALINERS



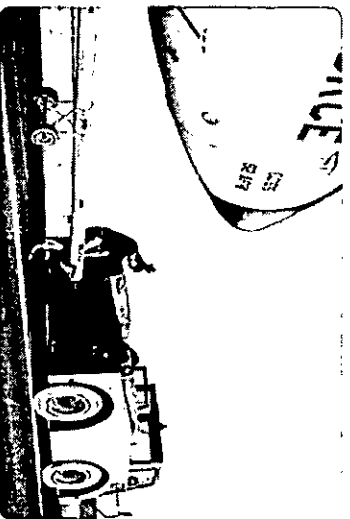






# Concept

## Tugs and Turbines



Aircraft rely on tugs and turbines to move on the ground

This is a cumbersome, expensive and unsafe method of moving aircraft on the ground

## WheelTug®



Integrated electric motors in the aircraft nose wheels offer full mobility without the use of turbines or tugs

Allows safer, cost-effective, more efficient operations  
Enables the redesign of airport airside operation

# Technical Issues - Tires

WheelTug's effect on tire wear: pros and cons

## **More tire wear**

Probable increase in inertial mass for landing

More “normal” friction during taxi

## **Less tire wear**

No scrubbing during turns - thrust is in-line with the nose gear

No scrubbing from single-engine taxi counter-forces (also less stresses on the rest of the nosegear)

# Technical Win - Brakes

Many aircraft use the brakes throughout taxi, as a counter to the engines. WheelTug means

- Far less brake use during normal taxi, because no engine to counter
- Much more cool-down time after landing event, allowing for faster turnaround.

Sometimes aircraft cannot turn around fast enough because brakes are ridden during taxi, keeping them too hot for takeoff.

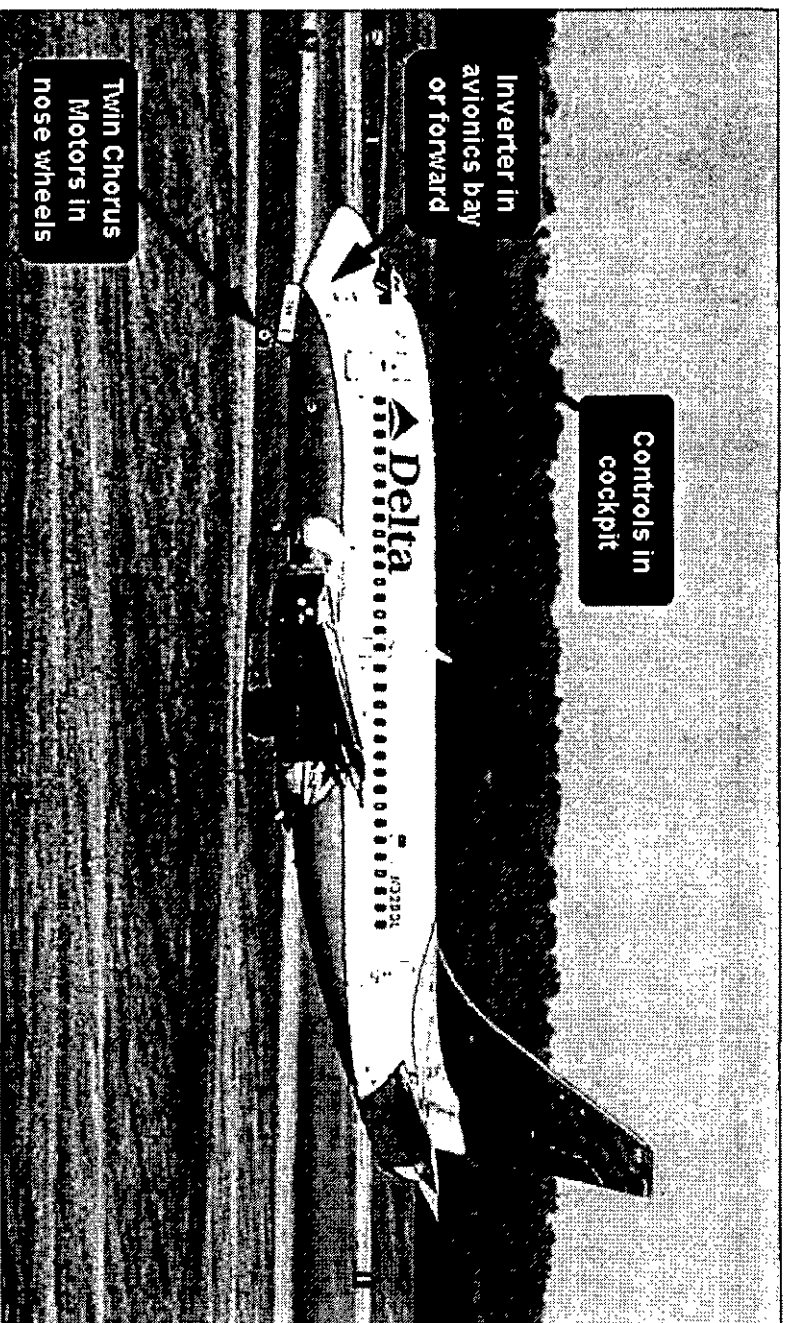
Less brake use is less brake wear and cost

# Technical Win - Tug Damage

Between tug damage, tow bar damage, the cost of shear pin replacements (time and money and resources), there is also extensive landing gear damage from use and misuse of tugs, including impact shock forces in normal tug operation, either during hookup or initial pushback procedure

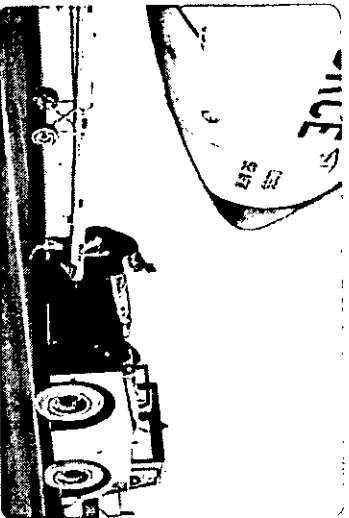
These are stresses that WheelTug eliminates

# Changes to Aircraft



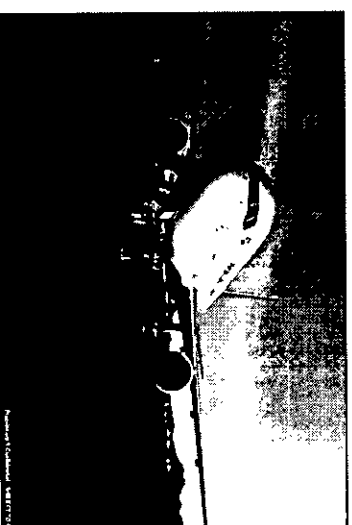
# Environmental Advantages

## Tugs and Turbines



Today's aircraft waste considerable fuel by using turbines to taxi, creating emissions including greenhouse gases

## WheelTug



Less fuel used and less fuel burned. Fewer emissions and greenhouse gases and significantly less noise

# Specific Green Benefits

WheelTug environmental benefits if applied to in-service 757s  
As compared to emissions occurring today from 757 fleet.

Pollutant	Reduction (Tons/Year)
CO <sub>2</sub>	590,000
HC	772
CO	7,891
NO <sub>x</sub>	1,503
SO <sub>2</sub>	184

(aircraft only - removal of diesel exhaust from tugs not included)

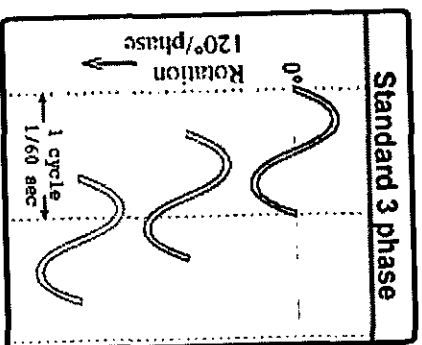
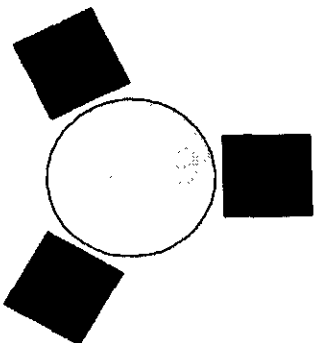


# The idea is OLD

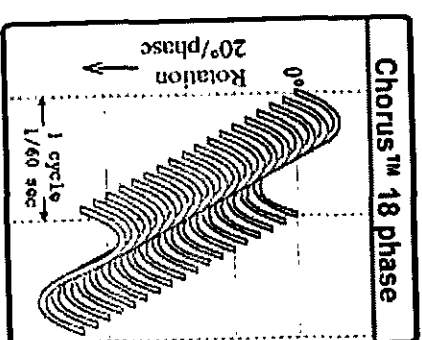
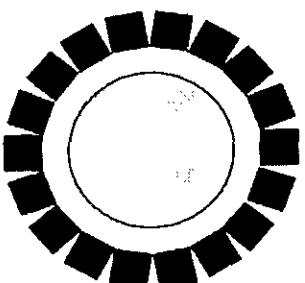
- The idea of a powered nosewheel is almost as old as the idea of an airplane. Like pre-rotation, it is an idea that everyone “discovers” anew.
- Issued patents show many such ideas. But until a motor solution came along, they were just ideas
- The proprietary Chorus® Motor is the solution

# Chorus® Technology I

## Traditional 3 Phase



## Chorus Motor



### Benefits:

- Use of entirely standard components
- Greater sampling rate yields less harmonic distortion
- Electronic control of additional poles allows automatic reconfiguration of the motor for different torque/speed profiles

# Chorus® Technology II

## *Chorus Technology*

- Harnesses harmonics, rather than minimizing them
- Enables:
  - 10X more torque than other induction motors
  - Up to a 70% reduction in size and weight of electronics
  - Improved reliability

3 Phase - fundamental in the middle, 5th harmonic on right

QuickTime™ and a  
Animation decompressor  
are needed to see this picture.

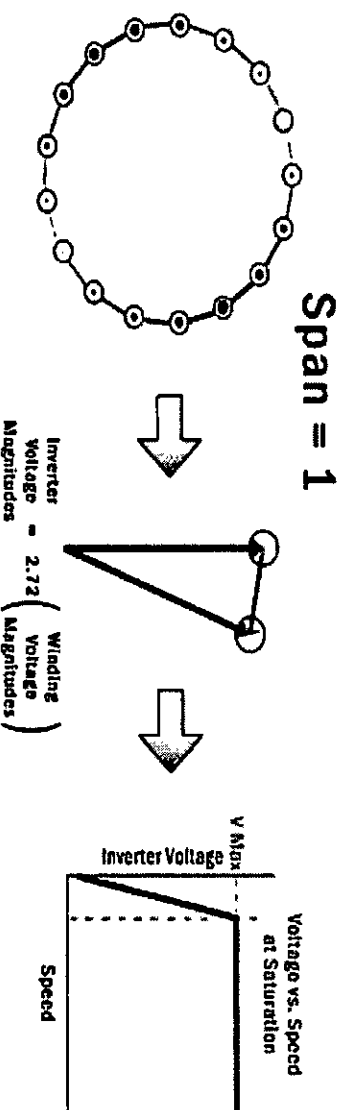
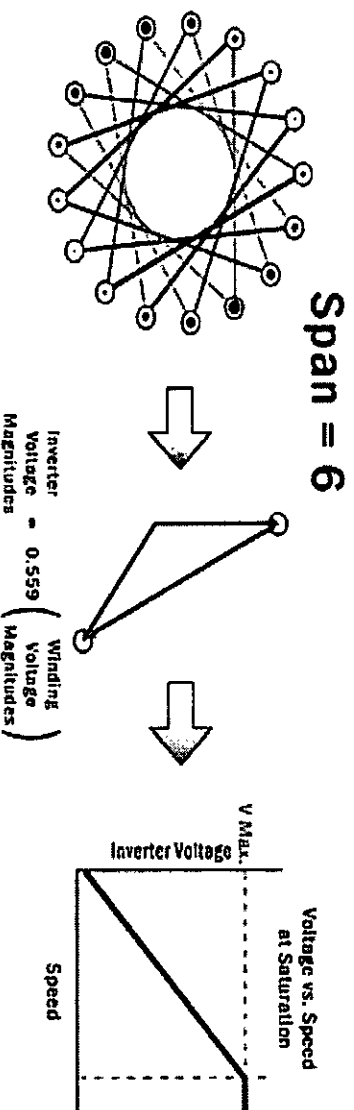
Chorus - fundamental in the middle, 5th harmonic on right

QuickTime™ and a  
Animation decompressor  
are needed to see this picture.

More explanation at <http://chorusmotors.gi/technology/animations.shtml>

# Chorus Technology

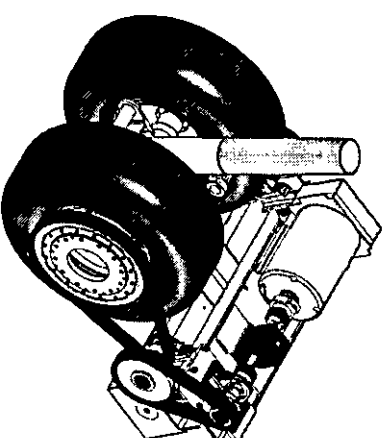
The mesh connection's Span value changes the relation of inverter current to winding current, thus changing the Volts-to-Speed curve of the motor.



# Proof-of-Concept Demo

## Chorus, Boeing and Air Canada

- Goal: demonstrate that two watermelon-sized Chorus Motors could in fact move a 300,000 pound airplane
- Outside-wheel design
  - “bolt-on” design
  - no use of APU
- Design, assemble, integrate, and test
  - 4 month deadline, start to finish.



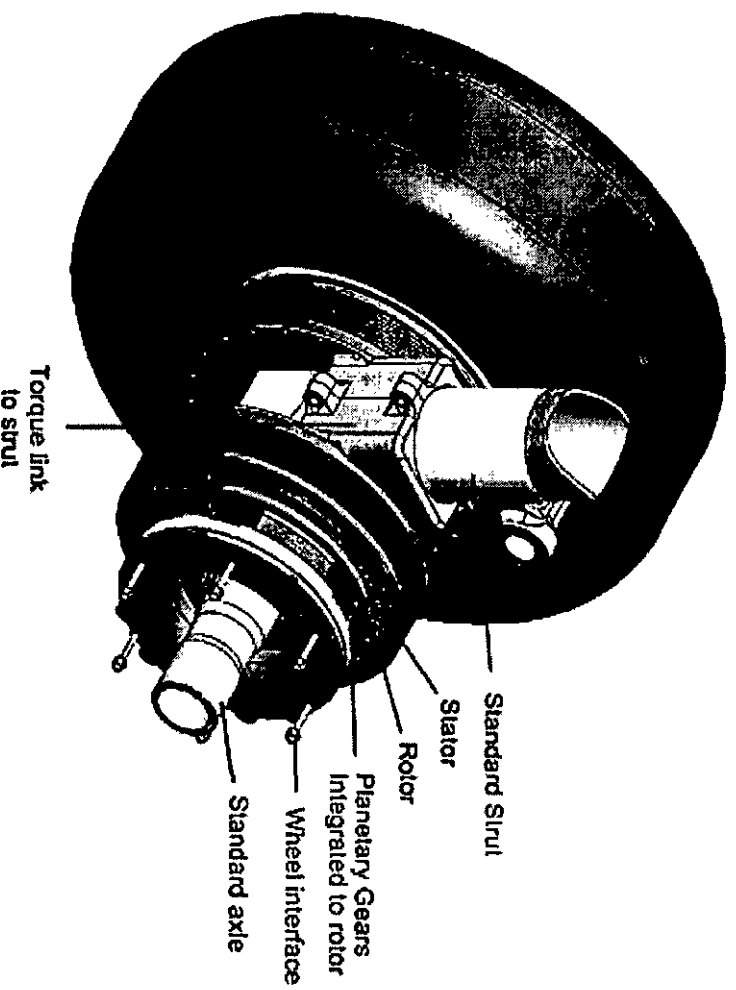
Achieved on schedule and on budget

# Proof-of-Concept Demo

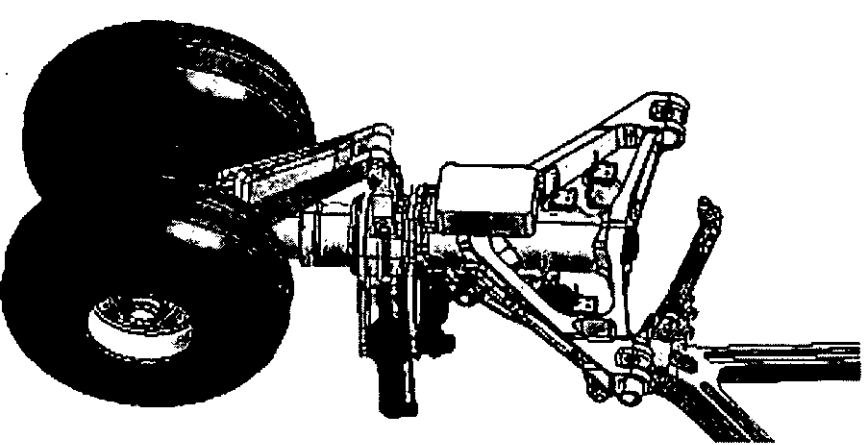


# Potential Production Design

Potential WheelTug Configuration



Copyright © WheelTug plc





# DC versus AC

## DC Brushless

DC permanent magnet designs may be able to achieve required torque level. Dangers of using a DC motor include

Any time a DC motor spins, power is being produced

Failure Modes - uncontrolled generator, demagnetization, arc welding, runaway

Aircraft out of service

## WheelTug

WheelTug is an electromagnet solution, using classic, reliable and rugged 3 phase components

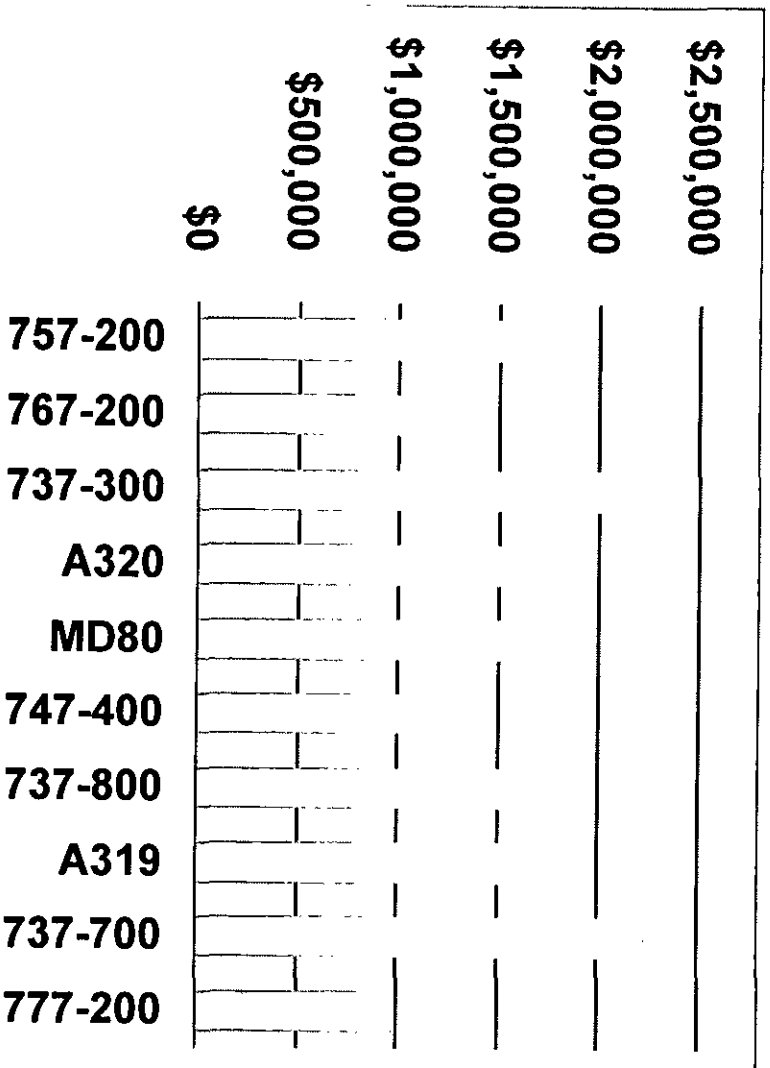
There is no motor/generator unless WT is externally magnetized

Failure Modes - a dead WheelTug is a free-wheeling nosewheel, which can be moved via tug or turbine

Aircraft should remain in service

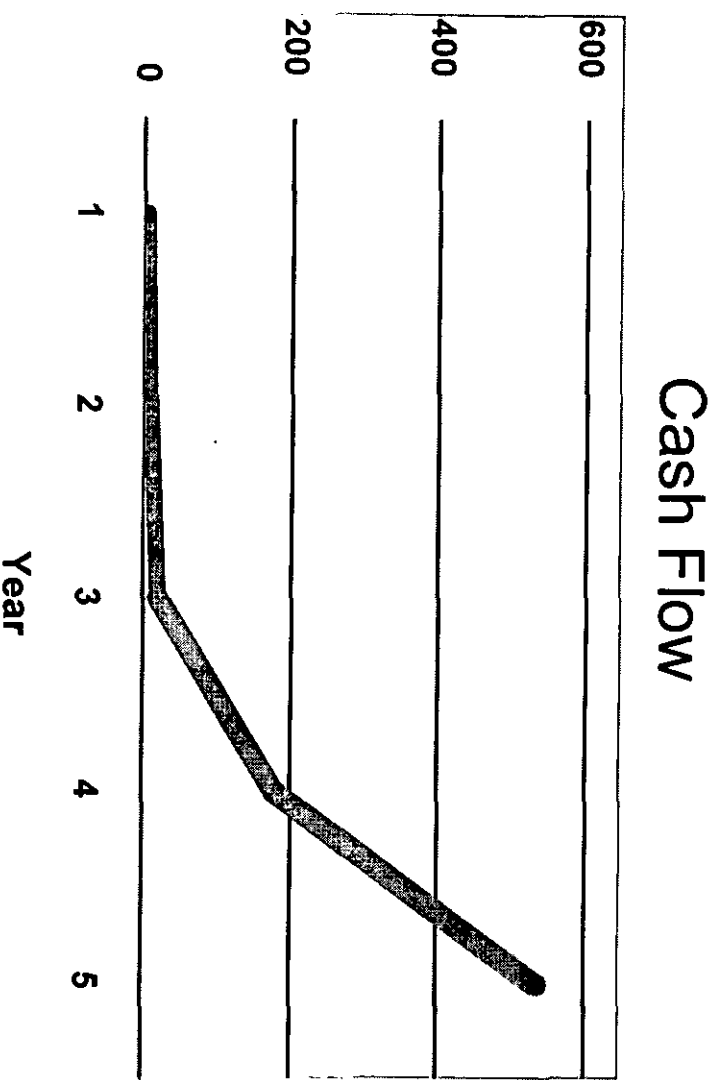
# Savings/WheelTug/Year

Pushback + Predictability + Fuel + Maintenance – Cost of Added Weight  
(no consideration for environmental and other airport operational benefits)



# Business Model

- Power-by-the-hour leasing of the legacy fleet
- Staging of aircraft models by:
  - Financial Value
  - Market Demand
  - Technical Feasibility



# Engineering Development

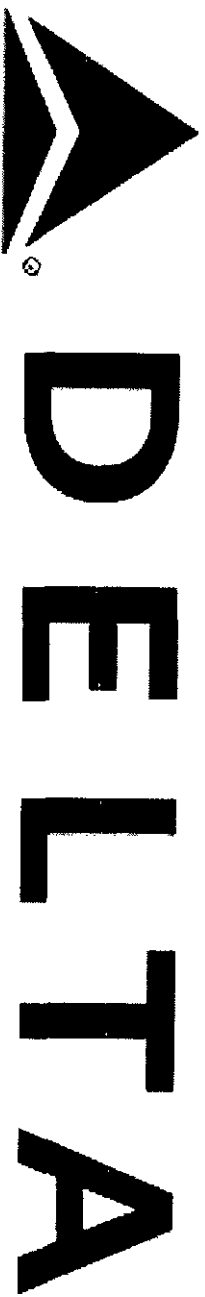
WheelTug aims to follow the model set by Aviation Partners in their development of the winglets for 737s.

- Rely extensively on senior, recently retired engineers from airframe and component suppliers
- Retain the option to partner with companies with select expertise in systems ranging from landing gear to cockpit interfaces

# Certification Development

WheelTug has added its senior certification advisor, and is assembling a complete certification team of DERs and DARs

Certification is the critical path, and development will follow the Plan developed after close consultation with the FAA



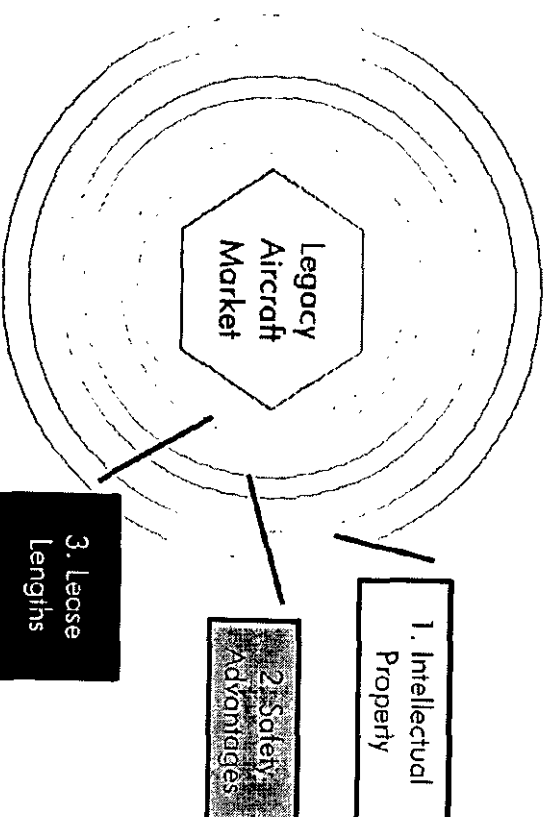
- In March, Delta became WheelTug's Launch Customer for the 737NG
- Delta is also our exclusive North American 737NG Development Partner
- Certain rights to installation and maintenance of Airline 737NG WheelTugs
- Rights to 600,000 WheelTug shares at average price of \$36/share

# Competitive Advantages I

- WheelTug retains 100% of its Intellectual Property, with no rights assigned to any outside party. No government R&D money anywhere
- Over 18 US Chorus patents issued so far (with worldwide coverage on key patents). See web site
- First of many WheelTug-specific patents issued last week

# Competitive Advantages II

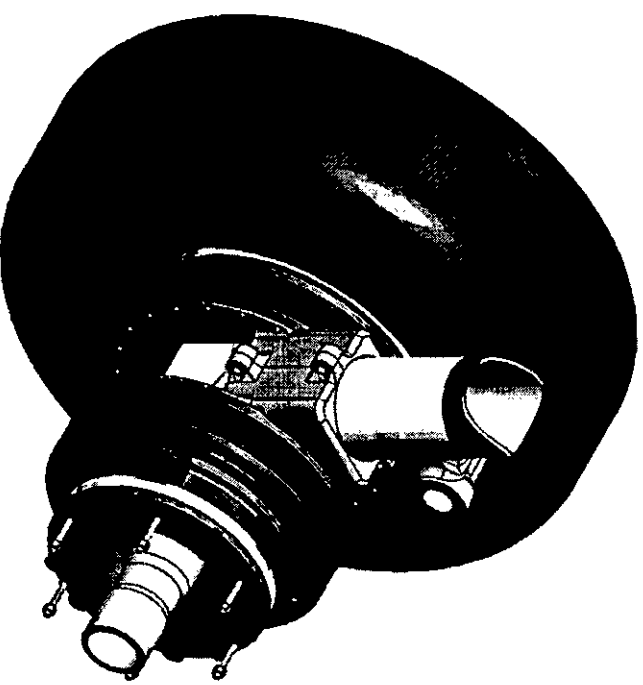
- WheelTug plc has the exclusive rights to the Chorus Meshcon technology for moving aircraft on the ground
- WheelTug has multiple layers of competitive defenses





# Business Summary

- Wheeltug is an exciting investment opportunity
  - Proven customer interest, driven by the bottom line
  - Fundamental value
  - Superb competitive edge
  - Strong value proposition



## WheelTug Welcomes Gilbert Thompson

### Industry expert joins team to bring WheelTug® to commercial aircraft

GIBRALTAR, 7 May 2007 - WheelTug plc, in its drive to bring WheelTug to market, has appointed Gilbert Thompson as its Senior Certification Advisor. Mr. Thompson, who has more than 30 years experience of airplane certification with the US Federal Aviation Authority, will guide WheelTug through the certification process. Certification ensures that new products meet the requirements of aviation authorities.

The proprietary WheelTug® technology is designed to allow airplanes to taxi without using their main engines, saving expensive jet fuel and reducing harmful emissions. The technology consists of special high-torque AC electric motors in the nosewheel hub that can drive the airplane without the need for external tugs. In tests, a prototype WheelTug module moved a fully-loaded Boeing 767 in a series of maneuvers similar to those performed by commercial airliners.

WheelTug and Delta Air Lines recently entered into an agreement in which the airline will assist WheelTug in developing the system and be WheelTug's Launch Customer. The agreement gives Delta the right of first refusal to provide installation and maintenance services on WheelTug systems in the USA for itself and for other airlines that desire such services. Delta has also taken an option to buy up to 600,000 shares of WheelTug plc at an average price of \$36 per share.

Gilbert Thompson's certification experience includes the Robinson R22/R44 rotorcraft, Lockheed L1011, McDonnell Douglas DC-8, DC-9, DC-10, MD-80, MD-90, KC-10A, MD-11, MDHI 369/500NOTAR, MDHI 600, MDHI 900, the first concurrent and cooperative joint FAA/Joint Aviation Authorities certification of the Boeing 717-200, and development of the criteria for civil certification of the military Globemaster C-17. In 1999, he received the Aviation Week and Space Technology Laurels Award for outstanding achievement in the field of aeronautics/propulsion.

WheelTug plc President Isaiah W Cox said "We are delighted to welcome Gilbert to our team. He brings unparalleled experience of the certification process to the table and is the ideal person to help us bring the benefits of WheelTug to the marketplace."

Gilbert Thompson said, "WheelTug's nosewheel drive is one of the most exciting new projects in commercial aviation. Work has already begun in putting together a group of experienced certification specialists. I'm proud to help make this groundbreaking technology a reality."

Among the potential benefits of the WheelTug system are reduced fuel consumption, noise and emissions, shorter aircraft turnaround times between flights and a reduction in flight delays. The congested nature of many international airports also means that eliminating the frequent use of tugs to haul aircraft could also make a positive impact on airside safety.

For further information please contact:

Chris Bourne  
Head of Public Relations  
+44 (0)20 8571 5216  
[pr@wheeltug.gi](mailto:pr@wheeltug.gi)

WheelTug plc is a majority-owned subsidiary of Chorus Motors plc (US OTC: CHOMF). Chorus has developed the proprietary Chorus® Star and Chorus® Meshcon™ electric

motor technologies, which offer substantial performance improvements over comparable motor and drive systems. The Chorus systems produce high torque at start-up speeds and are ideal for traction applications besides aircraft, including automobiles, trucks, locomotives, and ships. WheelTug® and Chorus® are registered trademarks of Borealis Technical Limited plc. Please visit WheelTug's website at <http://www.wheeltug.gi> and read the forward-looking statement at <http://www.wheeltug.gi/fls.shtml>.



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WheelTug and Chorus are Registered Trade Marks of Borealis Technical Limited  
[Forward Looking Statement/Legal Disclaimer](#)

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**SOURCE: ADDAC (Association pour le Développement Durable dans l'Aviation Civile)**

**Jul 25, 2007 12:00 ET**

## **ADDAC Endorses WheelTug(R) for A320s**

PARIS--(Marketwire - July 25, 2007) - At a June 2007 meeting in London, ADDAC and WheelTug plc agreed to form a joint venture to promote the development and certification of the WheelTug® system for the Airbus 320 family and seek the cooperation of an Airbus A320 operator.

ADDAC (Association pour le Développement Durable dans l'Aviation Civile) is an association whose aim is to promote sustainable development in the world of civil aviation. Its members include engineers, pilots, flight attendants, air-traffic controller and airport ground staff.

WheelTug is a revolutionary new system under development that will enable pilots to back away from gates without a need to and from takeoff and landing points without using jet engines. This new propulsion system uses twin special high-torque Chorus® electric motors, located in the nosewheel assembly. In June 2005 tests with Boeing, a prototype demonstration moving a fully-loaded Air Canada Boeing 767 in a series of manoeuvres similar to those performed by commercial airlines.

Among the benefits of the WheelTug system are:

- Reduced fuel consumption
- Reduced greenhouse gas emissions
- Reduced noise on aprons and taxiways
- To give pilots total control over their plane from gate to gate, free from the dependence on tow tractors and tugs
- No airport tug accidents
- Lower operating cost

A new step has been reached towards mass production. WheelTug and Delta Air Lines recently entered into an agreement for the development and certification of the system for the Boeing 737NG family.

The system may have application to business jets and even helicopters.

For more information, see the following websites:

<http://www.addac.fr>

<http://www.wheeltug.com>

Contact information:

ADDAC

Loïc Chappoz

Président

Email Contact

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# WheelTug plc

GIBRALTAR COMPANY NUMBER 94119  
INFORMATION CIRCULAR  
Fiscal Year 2007

## 1. SOLICITATION OF PROXIES:

This information circular is furnished in connection with the solicitation of proxies by the Management of WheelTug plc ("Company") for use at its Annual Meeting of Members to be held 27 June 2007 in Gibraltar and via the Internet at [www.wheeltug.gi](http://www.wheeltug.gi), with the Record Date of the meeting being 30 April 2007, for the purposes set forth in the Notice of Meeting. It is expected that the solicitation will be by mail, e-mail, fax, Internet web site, telephone or in person by Officers and Directors of the Company. The cost of solicitation will be borne by the Company. The information contained herein is given as of 31 March 2007, unless otherwise indicated. All dollar figures set forth are expressed in United States Dollars. All accounting is done in accordance with Gibraltar Generally Accepted Accounting Principles (GAAP).

## 2. QUORUMS AND VOTING:

The authorised share capital of the Company is \$100,000, consisting solely of one class of common shares divided into 10,000,000 shares with par value of \$0.01 per share, of which 6,933,348 shares were outstanding at the close of business 31 March 2007.

Each holder of record of a common share as of the Record Date for the meeting is entitled to attend the meeting and to cast one vote for each share. Proxies are being accepted by hand delivery, mail, e-mail, fax, and the Company's Internet website at [www.wheeltug.gi](http://www.wheeltug.gi). Any resolution to be voted upon at the meeting must be approved by a majority of the votes cast, unless the Company's Articles of Association stipulate a number or proportion of the votes cast in excess of a majority. The meeting will proceed as long as there is a quorum at the meeting place including the voted proxies.

## 3. REVOCATION OF PROXIES:

Each shareholder has the power to revoke a proxy at any time as long as it has not been exercised. In addition to revocation in any other manner permitted by law, a member giving a proxy pursuant to this solicitation who wishes to revoke the proxy instrument may do so in writing. This revocation must be executed by the member, or by his attorney authorised in writing, or, if the member is a Corporation, under its Corporate seal or by an officer or attorney thereof duly authorised, and received by mailed, or deposited, at any office of the Company, via e-mail to [proxy@wheeltug.gi](mailto:proxy@wheeltug.gi), or by fax to +44.207.504.3593 at any time up to and including the last business day preceding the day of the meeting, or any adjournment thereof at which the proxy is to be used, or with the Chairman of such meeting on the day of the meeting, or adjournment thereof.

## 4. PRINCIPAL HOLDERS OF VOTING SHARES:

To the knowledge of the Directors and Officers of the Company there is no person who beneficially owns or exercises control or direction over shares carrying more than ten percent of the votes attached to shares of the Company as of 31 March 2007 except:

Chorus Motors plc owns 6,709,065 shares which is 96.77% of the outstanding shares. Chorus Motors plc is 78.80% owned by Borealis Technical Limited.

## 5. ELECTION OF DIRECTORS:

### Present Directors

Isaiah W. Cox, A.B.  
Wayne S. Marshall, Ph.D.  
Rodney T. Cox, Ph.D.

### Remaining Term

up for election  
1 year  
2 years

The proxy will be voted for the following proposed nominees (or for a substitute nominee in the event of contingencies not known at present) who will serve for a period of 3 years, or their successors if they are elected or appointed in accordance with the Articles of Association of the Company. Respective reported share totals are as at 31 March 2007.

ISAIAH W. COX became a Director of the Company on 8 February 2005. He is currently also a Director of Borealis Exploration Limited, Borealis Technical Limited, Avto Metals plc, Cool Chips plc, Photon Power plc, Power Chips plc, Roche Bay Holdings Limited, Roche Bay Holdings (Barbados) Limited, Credits Holdings Limited, Borealis Roche Bay Limited, WheelTug plc, Cool Chips Military Sales plc, and Faraway plc. Mr. Cox is a Member of the Council of the Jeremiah Toyam Cox Foundation Limited and the Hart Cox Foundation Limited, among other foundations based in Gibraltar. Isaiah W. Cox beneficially owns directly or indirectly 18,001 shares of WheelTug plc.

**THE PRESENT POSITION AND OFFICE WITH THE COMPANY IF APPLICABLE, AND THE PRESENT PRINCIPAL OCCUPATION OR EMPLOYMENT OF THE INCUMBENT DIRECTORS AND OFFICERS ARE AS FOLLOWS. UNLESS OTHERWISE STATED, SUCH OCCUPATION OR EMPLOYMENT HAS CONTINUED FOR MORE THAN THE LAST FIVE YEARS.**

**WAYNE S. MARSHALL** became a Director of the Company on 8 February 2005. He is Emeritus Professor of Business Administration, Long Island University. Dr. Marshall is Chairman of the Executive and Compensation Committees, and a member of the Audit Committee of the Company. He is currently also a Director of Borealis Exploration Limited, Borealis Technical Limited, Avto Metals plc, Cool Chips plc, Photon Power plc, Power Chips plc, Roche Bay Holdings Limited, Roche Bay Holdings (Barbados) Limited, Roche Bay plc, Credits Holdings Limited, Borealis Roche Bay Limited, WheelTug plc, Cool Chips Military Sales plc, and Faraway plc. Dr. Marshall is a Member of the Council of the VSBM Foundation Limited, among other foundations based in Gibraltar. Wayne S. Marshall beneficially owns directly or indirectly 12,201 shares of WheelTug plc.

**RODNEY T. COX** became Chief Executive Officer on 8 February 2005. He is a member of the Executive, Audit and Compensation Committees. He was a Partner in The Parmenides Group until February 2000. He is currently also a Director of Borealis Exploration Limited, Borealis Technical Limited, Avto Metals plc, Cool Chips plc, Photon Power plc, Power Chips plc, Roche Bay Holdings Limited, Roche Bay Holdings (Barbados) Limited, Credits Holdings Limited, Borealis Roche Bay Limited, WheelTug plc, Cool Chips Military Sales plc, and Faraway plc. Dr. Cox is a Member of the Council of the Hart Cox Foundation Limited and the Jeremiah Toyam Cox Foundation Limited, among other foundations based in Gibraltar. Rodney T. Cox beneficially owns directly or indirectly 1 share of WheelTug plc.

**STM Fidecs Management (Gibraltar) Limited** (formerly known as Fidecs Management Limited) became Corporate Secretary of the Company on 8 February 2005.

**6. APPOINTMENT OF AUDITORS:**

Unless otherwise specified therein, it is presently intended to vote the proxy to appoint Moore Stephens, Chartered Accountants, Gibraltar, as auditors of the Company, to hold office until the next annual meeting of shareholders, and to authorize the Directors to fix their remuneration.

**7. INSURANCE:**

The Company has liability insurance for its various offices and facilities worldwide. The Company indemnifies all of its Officers and Directors against any legal actions or threatened legal actions that are in any way related to their relationship to the Company. The indemnification includes paying all legal bills and all costs of any kind relating to any such claims.

**8. INTEREST OF LARGE SHAREHOLDERS IN MATERIAL TRANSACTIONS WITH THE COMPANY:**

Borealis Technical Limited collects a nominal annual retainer fee for managing the business of WheelTug plc through its parent company Chorus Motors plc. WheelTug plc is being charged by its parent company, Chorus Motors plc for its share of development expenses.

**9. GENERAL:**

The Management knows of no matter to come before the Annual Meeting other than the matters referred to in the Notice of the Meeting. If any matters that are not now known to the Management should properly come before the meeting, the accompanying proxy instrument will be voted on such matters in accordance with the best judgment of the person or persons voting it.

The contents and sending of this information have been approved by the Directors of the Company.

Dated 1 June 2007

**WheelTug plc**

A handwritten signature in black ink, appearing to be 'R. T. Cox', written over a horizontal line.

Rodney T. Cox, Ph.D.  
CEO/Chairman of the Board

A handwritten signature in black ink, appearing to be 'I. W. Cox', written over a horizontal line.

Isaiah W. Cox, A.B.  
President/COO

**END**